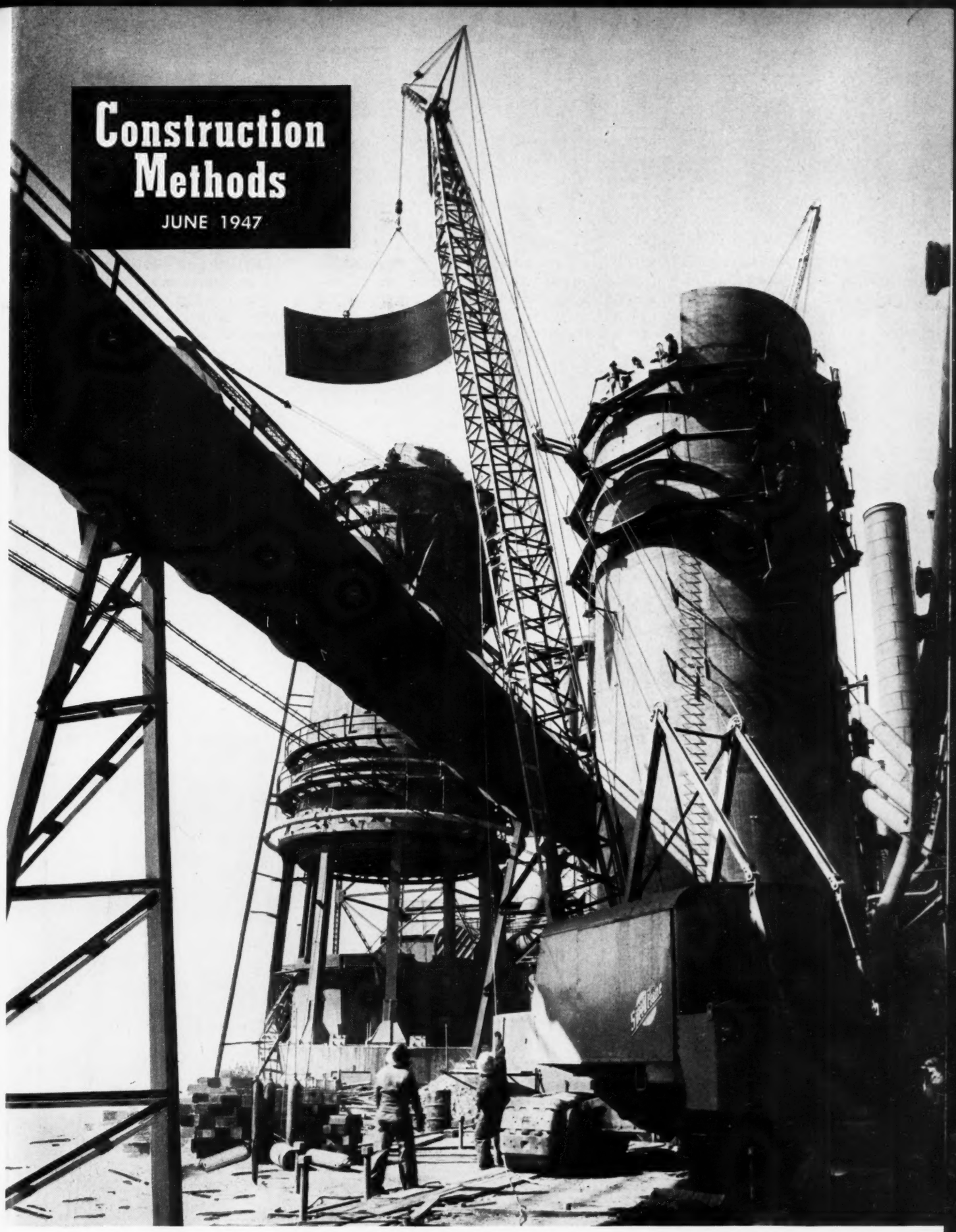
Construction Methods

JUNE 1947



MORE IRON for more steel for more construction. Carnegie-Illinois Steel Corp. is replacing two old furnaces at its South Chicago Works with two of the largest blast furnaces ever built, 28 ft. dia. and 108 ft. high, each to produce 1,509 tons of iron daily. Arthur G. McKee & Co., Cleveland, is contractor on the job, and this view shows one of their Manitowoc Speedcranes topping out the stove for new furnace No. 11, under construction beyond the big gas line.

U. S. Steel Photo

Cableway and Tramway Handle Excavated

By L. G. McCRAY, Engineer,

DEEPENING the Hoover Dam tailrace 5 ft., equivalent to adding 5-ft. head in Lake Mead, and scaling all loose material from the canyon walls just below the dam required 850,000 cu. yd. of excavation. Nearly half of this material was moved across the Colorado River by cableway and all of it was raised 550 ft. by tramway up the Arizona bluffs for disposal in nearby side canyons. This work, along with alterations to the four tunnel outlets, constitutes some of the most unusual construction procedure in the many interesting operations since the conception of the Boulder Canyon project in 1930.

The project, just completed by the Guy F. Atkinson Co., San Francisco, under a $2,586,000 contract with the U. S. Bureau of Reclamation, was designed to improve the hydraulic characteristics of flows through the four 50-ft. tunnels and to lower the level of the tailrace. Excavation items included 14,000 cu. yd. rock for structures, 21,000 cu. yd. rock for road relocations, 295,000 cu. yd. dredging from the river for 2,500 ft. below the dam, 230,000 cu. yd. scaling from the Arizona side and 280,000 cu. yd. from the Nevada side, both extending downstream for 1,700 ft.

Disposal of spoil was the biggest problem of excavation. The Nevada access road had to be relocated because of the excavation, and retaining walls had to be built, which messed up any plans for disposal on that side. On the Arizona side the access road was to be entirely removed, which prevented its use for disposal. Then there was all the debris dredged out of the river that had to be carried well back of, which meant high above, the channel, beyond any possibility of sloughing back into the river in the future.

Spoil Handling

Atkinson met these excavation problems in a most ingenious manner, based on disposal of all material on the Arizona side back of the inner canyon rim. To transport spoil from the Nevada bluff an 800-ft. 30-ton cableway was installed, handling dump skips. From

EXCAVATING 850,000 cu. yd. from river and gorge sides below Hoover Dam (below) was a tough job of disposal, for all spoil had to be wasted back of canyon rim to left via tramway shown here. This view, taken at start of work, clearly shows loose material to be removed from both sides of river. Later cableway was installed to transfer spoil from right bank (Nevada side) across river to tramway.

Material From Hoover Dam Tailrace ★ ★

U. S. Bureau of Reclamation Boulder Canyon Project

the Arizona river bank, below this cableway, a 1,000-ft. double-track tramway was built to a point on the rim 550 ft. above river level. The upper part of the tramway, on 50-percent grade, was in cut and on fill, the lower part was on trestle on a 75-percent grade. Two special 15-yd. cars, running opposed as counterweights, at a speed of 600 ft. per min., were operated by a 500-hp. mine hoist. At the extreme lower end the tramway was single track to simplify loading operations.

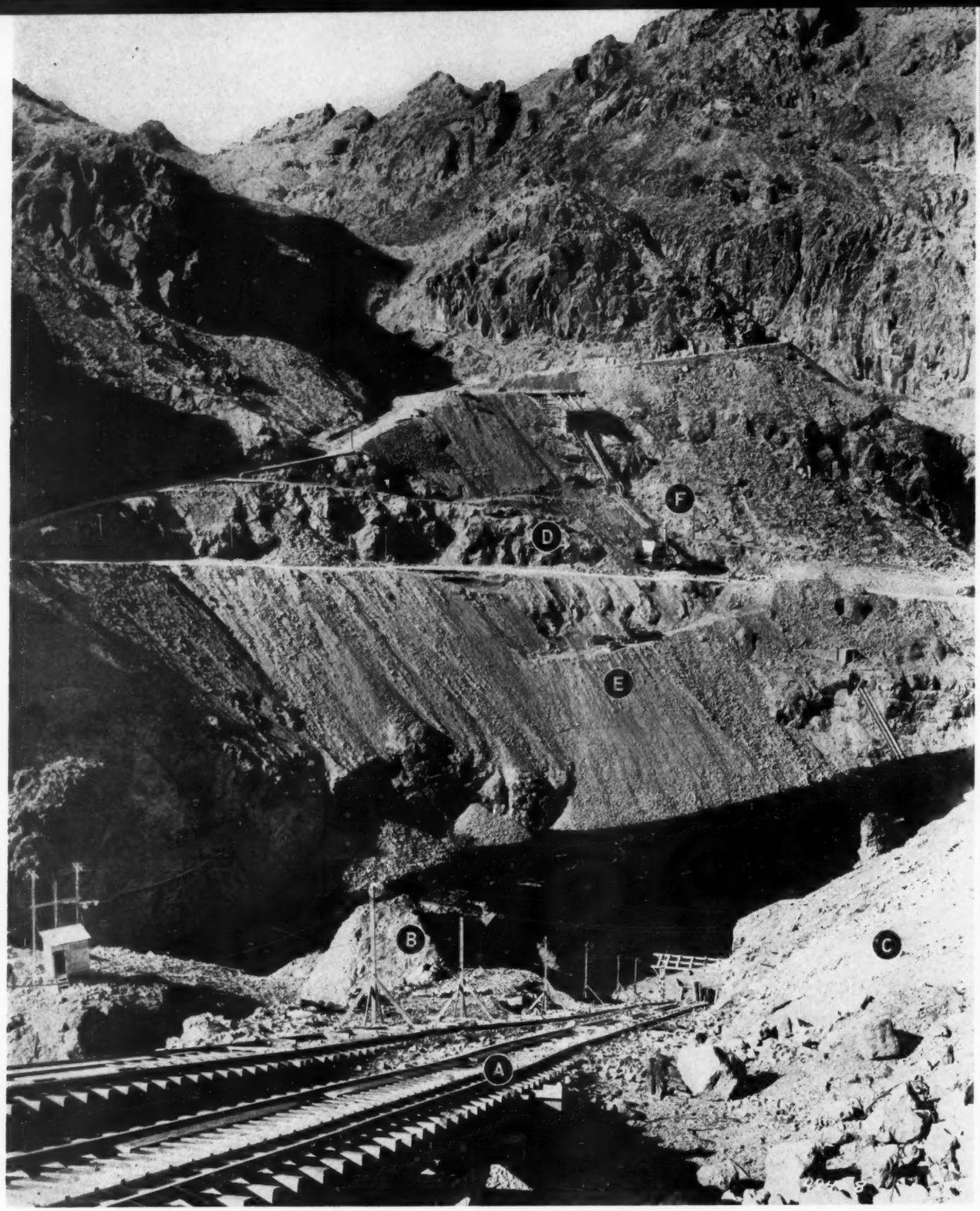
Because topographical conditions prevented spotting the cableway directly over the tramway loading point, spoil was transferred from cableway to tramway by the shortest truck-haul on record, 15 ft. From the tramway top tipple four 20-yd. Sterling dump trucks hauled the material to dump areas.

→ **HEADTOWER and tipple of tramway, where 15-yd. special cars dumped into Sterling trucks for final disposal of excavated material. Tramway was powered by 500-hp. electric mine hoist; the two cars ran opposed as counterweights.**

Excavation and Dredging

Most of the excavation and dredging was done with two Bucyrus-Erie shovels and a Sauerman slackline cableway. At the start of the job Atkinson built a 40x80-ft. wooden barge at the top of the dam under the permanent cableway that serves the powerhouse area. The barge, weighing 122 tons, was launched into the river by the cableway for use as a work boat. Its first job was to transport a B-E 120B shovel, also lowered by the cableway, to the Arizona bank work area. This shovel was

→ **TRAMWAY up Arizona bluff, on grades from 50 to 75 percent, is 1,000 ft. long, rises 550 ft. It is partly on fill, in cut, and on trestle. Combination Caterpillar bulldozer and tractor crane in foreground is high on Nevada side. To left of tractor crane boom can be seen B-E 120B dragline working on Arizona river bank after loading out all loose material on that side while converted to shovel. At right of crane boom is movable hoist house for Sauerman 8-yd. slackline cableway that dredged the river, pulling spoil to within reach of dragline for loading.**



MUCH DEBRIS had to be moved from Nevada canyon wall, seen across river. Various plant items shown here are: (A) 1,000-ft. tramway on the Arizona side; (B) Job transformer station; (C) Cableway tail tower (behind spur); (D) Headtower of 800-ft. cableway for transfer of spoil from Nevada side to tramway; (E) Cableway loading point; (F) Aggregate bins and batching plant for tunnel concrete.

also later removed from the job by barge and cableway.

The 120B, as a shovel, benched down the loose material from the Arizona side, loading into Sterling trucks for transfer of spoil to the tramway, leaving a 100-ft. berm at the bottom just above river level. Then the rig was converted to a 100-ft. boom dragline to dig out the berm and the adjacent river channel. Working with the dragline was a Sauerman slackline cableway, with an 8-yd. bucket, dredging the river bottom and the Nevada shore area. Tail blocks were set on the Nevada side for this work. Spoil from this operation was loaded by the dragline into trucks.

Meanwhile a 54B shovel was working on the Nevada side, loading loose material into trucks for transfer to the cableway skip. The 120B dragline was later moved across the river by barge to complete the Nevada excavation.

★ TUNNEL ALTERATIONS DIFFICULT JOB ★

JUST AS INTERESTING as the excavation work described in the foregoing article and far more difficult and expensive, was the altering of the four tunnel outlets. Tunnel No. 1 (outer Nevada tunnel) was extended 375 ft. downstream in a cut-and-cover section, of 6-ft. minimum wall thickness, on an 800-ft. radius curve toward the river. The interior 50-ft. dia. circular section of the old tunnel was maintained in the extension for 275 ft., then over the last 100 ft. the sidewalls were gradually narrowed and the invert raised to constrict the portal to two-thirds the full tunnel area to give its discharging water a jet action that will carry it well into the river.

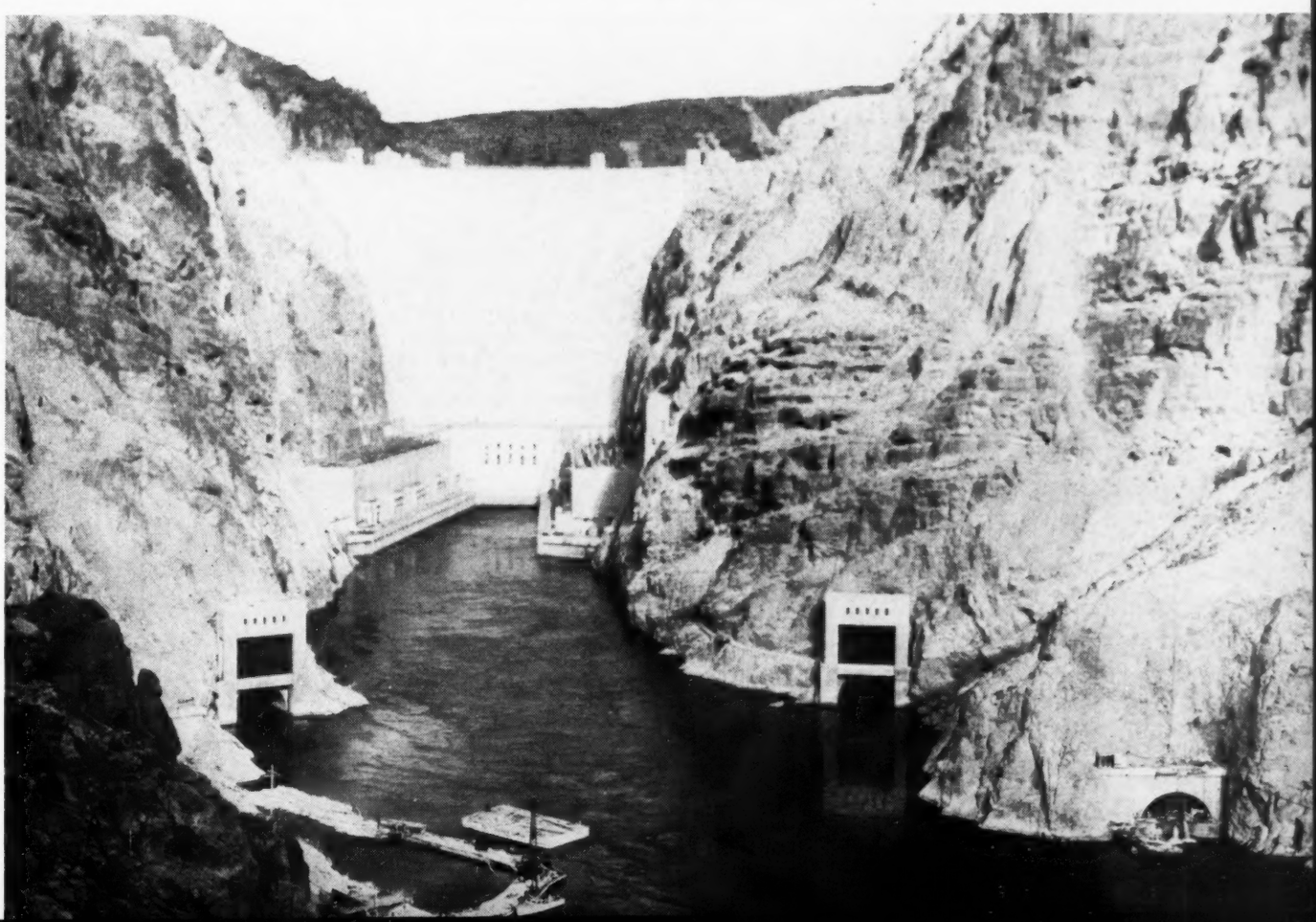
In Tunnels 2 and 3 (inner Nevada and Arizona bores, respectively) new inverts 6 ft. thick at the center and curved to an 85-ft. radius replaced the old 3-ft. floors. In Tunnel No. 2 the new invert extends 630 ft. back from the portal, in No. 3 it is 305 ft. The last 100 ft. in both cases is a transition section, similar to that in No. 1, constricting the outlet into a jet turned toward the river. Only the 100-ft. transition section was installed in Tunnel No. 4 (Arizona outer tunnel).

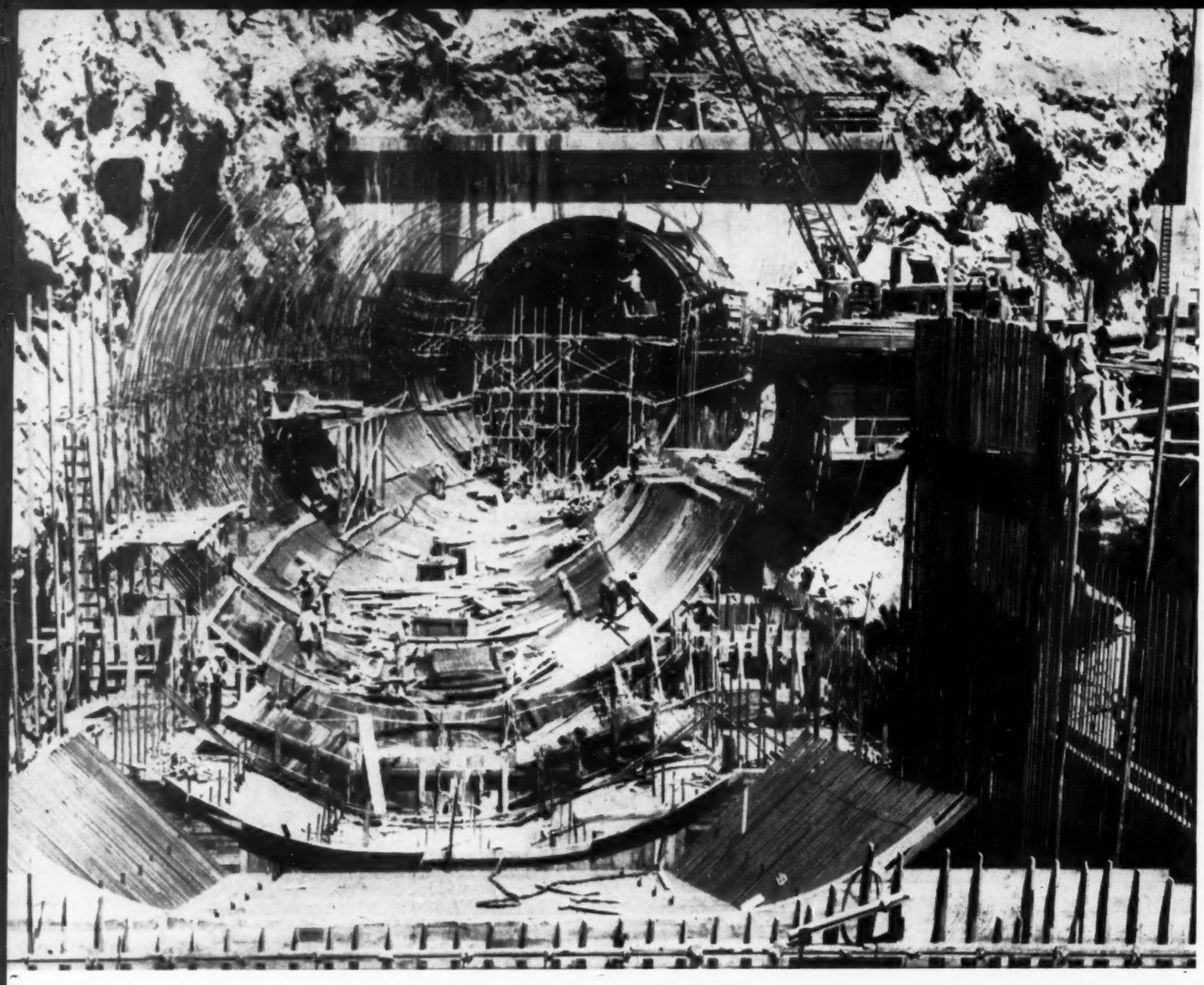
The most difficult part of the tunnel work was removal of 1,850 cu.yd. of old concrete. After several experiments with methods of removal without blasting, all of which proved impractical and too expensive, the contractor was given permission to try explosives. Finally, the procedure adopted was to cut out a 40-in. strip on all sides of an area to be removed, thus isolating the section. The 40-in. strip was taken out by close drilling 3-in. holes with wagon drills and broaching out the intervening webs. Once a section was so isolated, it was carefully shot out by light loading drill holes with half a stick of 40 percent dynamite fired in rounds of 19 holes with delays up to No. 9. Thus, not more than two holes went off on the same delay and the shock to surrounding concrete was negligible. As a maximum of 25 ft. longitudinally could be removed in the deflector sections, it was necessary to place the new concrete for arch support and then remove the intervening sections. This made it necessary to protect the new concrete with planking and also to use cable shooting mats to stop flying concrete.

The extension to Tunnel No. 1 required a rock-filled timber-crib cofferdam. Cribs were fabricated on top and lowered into the river by the project cableway. Bulkheads at the portals served as cofferdams for the other three tunnels. For the open-cut sections at No. 1 all concrete was placed by a B-E 54B crane, running on top of the cofferdam, with an 80-ft. boom handling a 1-yd. bucket. Forms are wood throughout, some sections being re-used several times.

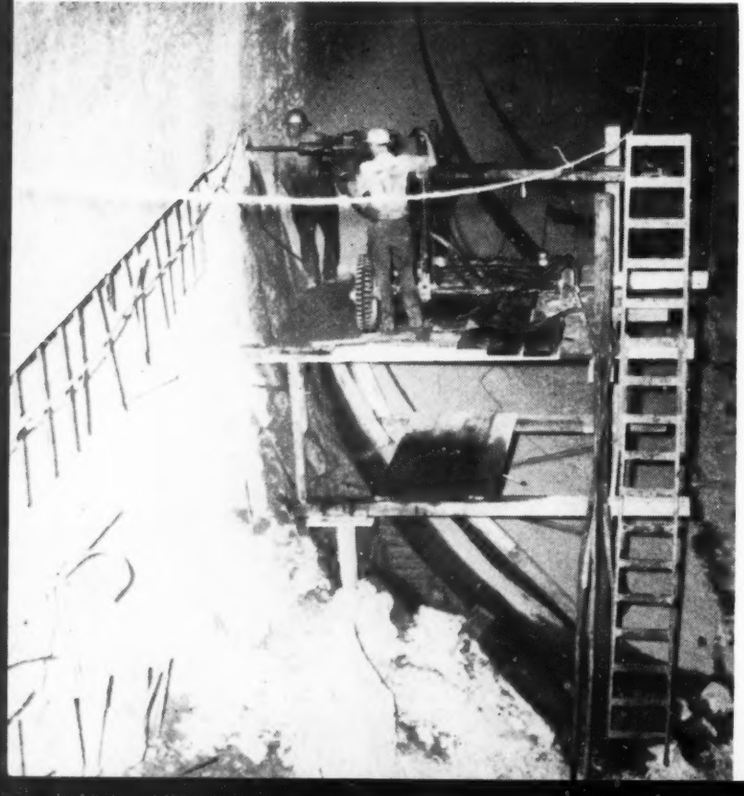
Line and grade of the interior

OUTLETS of four Hoover Dam tunnels (below) were altered in extensive operations involving careful removal of concrete without damage to that remaining. Tunnel No. 1 is behind bluff at left, but crib cofferdam for cut-and-cover extension can be seen. Bulkheads, as seen at portal of Tunnel No. 4 at extreme right, served as cofferdam for other three tunnels.





EXTENSION of tunnel No. 1 called for 375-ft. cut-and-cover section with 6-ft. minimum walls and roof. Area is protected by rock-filled timber-crib cofferdam. Old tunnel portal is 50 ft. in diameter; extension carries transition section constricting river outlet area by one-third.

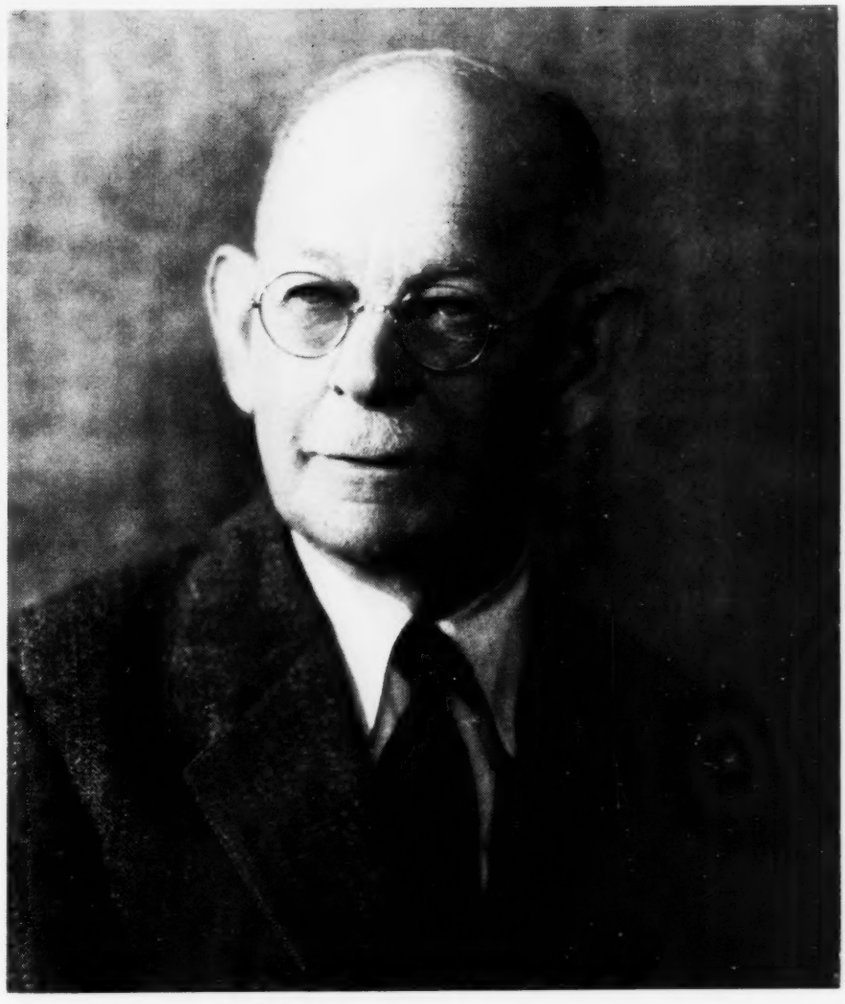


←
EXTREME CARE was necessary in removing parts of old 3-ft. concrete tunnel lining to prevent damage to that remaining in place. Sections to be removed were isolated by drilling and broaching, then were lightly shot with numerous delays, each hole sand - cushioned. Wagon drills on scaffolds did drilling.

surfaces were important. The arch was placed in three operations: from spring line to 22½ deg. above, next to 45 deg., and finally the remaining 90 deg. A movable wooden jumbo carried the arch forms. Transverse contraction joints were placed every 34 feet.

Concrete in Tunnel No. 2 was poured by means of a 750-ft. "Joe McGee" cableway running down the center of the tunnel carrying a 1-yd. bucket dumping into a transverse transfer car for final placement. Concrete was delivered to the cableway by buggies from a mixer on Tunnel No. 1 cofferdam. For Tunnel No. 3 concrete was delivered to a similar "Joe McGee" by a 1,000-ft. cableway crossing the river. In Tunnel No. 4 concrete was placed with buggies from runways, after delivery to the portal by a 900-ft. cableway from Tunnel No. 1 cofferdam. A total of

(Continued on page 154)



OSCAR W. SWENSON

FEW MEN who participated in building the first transcontinental railroad across western United States and Canada, conceded as the greatest construction triumph of the 19th century, are alive today. However, Oscar W. Swenson, who helped build 26,000 miles of early railroads, is very much alive, and despite his 83 years is still actively engaged in construction as head of Foley Bros., Inc., of New York, an offshoot of the original St. Paul firm, with headquarters at Pleasantville, N. Y.

Born in Chicago City, Minn., in 1864, Swenson was barely out of country grade school when he joined an engineering survey party locating the railroad from St. Paul to Duluth. Following railroad engineering, at the ripe age of 21 he became an assistant to the late James J. Hill, pioneer railroad builder. Somehow during his hectic young years, Swenson managed to round out his meager formal education at Carlton College, Northfield, Minn.

In 1888 he joined Foley Bros. as head of their logging and milling operations, but soon switched to construction as a career that eventually included building railroads in all parts of the United States and Canada, dams in California, tunnels in the East and West, terminals and harbor improvements in Nova Scotia, piers in New York harbor, drydocks in Philadelphia and Norfolk, airports in Nassau, mining operations in Montana and India, roads and docks in Iran, and countless other projects.

The energy of the man, both physical and mental, astounds all who know him. He enjoys golf and still knocks out 36 holes at a stretch. On his 72nd birthday he played 72 holes, carrying his own clubs the last nine when his caddy gave out. His present stamina stems from way back when, on western railroad work, he had to walk hundreds of miles on inspection and survey trips, and once did a 600-mile trek on snowshoes.

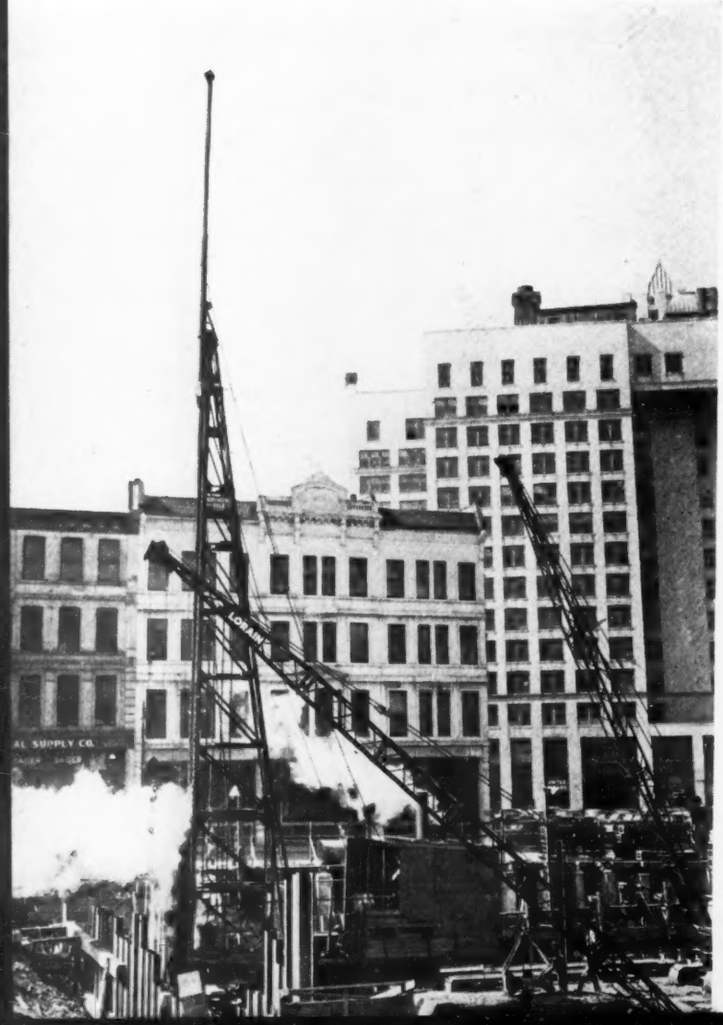
Swenson has seen construction progress from man and mule power through steam and gasoline into diesel and electric mechanization, and is anxiously looking forward to atom power. Upon receiving the Moles Award in 1946 for outstanding construction achievement, he reminisced about the old days. "During the pioneer era our problem was chiefly one of logistics—getting men and materials to the right place at the right time," he said. "Then, and only then, could we come to grips with nature's vast 'Siegfried Line' of wilderness, rock and muskeg. Today, while you grapple with the physical problems more quickly, you are saddled with man-made burdens and responsibilities the old-timers never dreamed of. In addition to being a constructor, you must be a banker, lawyer, tax expert, be conversant with thousands of union and government regulations, and be ready to furnish 20 copies of anything at a moment's notice."

Modern contracting problems don't bother Oscar W. Swenson. He grew up in the business when the going was really tough.

A FORTUNE IN RIGS works on 200x200-ft. foundations for New England Telephone & Telegraph Co. building in Boston. Two Raymond Standard piledrivers and Manitowoc Speedcrane put down sheetpiling as a Lima, two Lorains and a Bucyrus-Erie excavate cofferdam and set bracing. A Lorain Motocrane, a 1¾-yd. Lorain shovel and another Manitowoc were later added to speed project for which Turner Construction Co. is general contractor.

HEAVY EQUIPMENT

Crowds Boston Foundation Site



AROUND PERIMETER of building site, Raymond rig drives double line of steel sheetpiling within which 7-ft. thick foundation cut-off wall will be poured to prevent subsidence of adjacent buildings resting on clay. Pipe extension 32 ft. high on 72 ft. leads lifts sheetpiles so interlocks may be threaded.

BIG RIGS, and plenty of them, are speeding foundation construction for a new long distance exchange building being erected by Turner Construction Co. for the New England Telephone & Telegraph Co. in Boston. As many as eight machines — shovels, cranes, clamshells and piledrivers — are working in an area of less than 1 acre inclosed by a steel sheetpile

COFFERDAM CROSS-WALL (below) is driven by Manitowoc crane with 9B3 hammer as Bucyrus-Erie rig clams nearby rectangular cell. Cut is floored with woven wire mats to prevent miring of dump trucks.

cofferdam of narrow rectangular cells, later incorporated into the foundations, driven around the perimeter of the site to prevent settling of adjacent buildings resting on clay. Foundation walls, poured within the perimeter cells before general basement excavation, are carried into hardpan for firm support and an effective seal.

The long distance exchange will be a 200x200-ft., 16-story steel frame structure with two basements, and is designed for the later addition of six more floors. Sloping ground at the site, with a 9-ft. difference in elevation between diagonally opposite corners, is roughly paralleled by hardpan 60 ft. below. Above the hardpan, upon which the building will be founded, are layers of silty sand, sand and gravel and boulders, topped by a thick blanket of blue clay.

The site was first excavated to El. + 5, 20 ft. below curb, then a line of ZP38 steel sheetpiling 25 to 50 ft. long was driven to hardpan around the exterior. A second ring of similar sheeting was driven 7 ft. inside the first except at one corner where it widened to provide a cofferdam for a 90x90-ft. boiler room extending below subbasement level. Tee sheets on 20-ft. centers in each line enabled diaphragms to be driven to subdivide the long perimeter cofferdam into 28 short cells. Two Raymond Standard 45-ton pile rigs with 32-ft. mast extensions on 72-ft. leads and No. 1 Vulcan hammers drove the line sheets, and were followed by a Manitowoc Speedcrane with hanging leads and McKiernan - Terry 9B3 hammer driving the cross-walls.

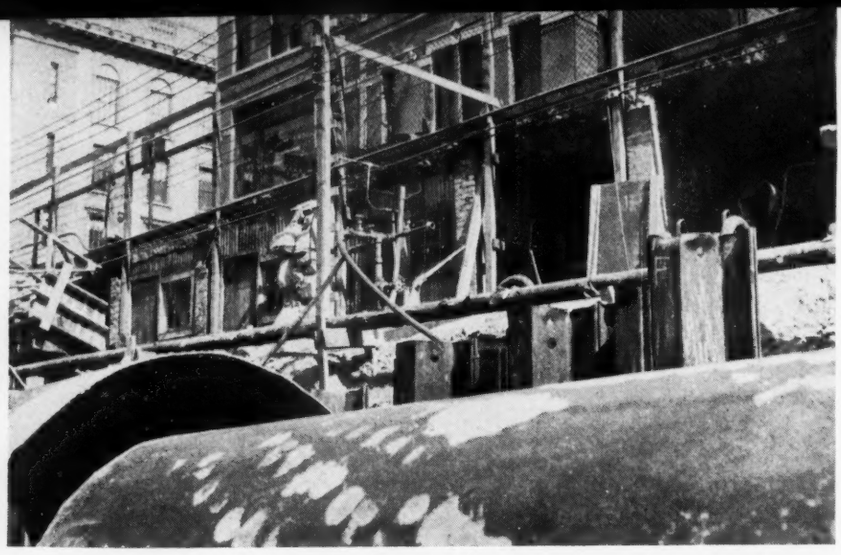
Crawler clamshells excavated cells alternately, and the cofferdams were braced internally by five or six welded steel sets of 10- to 14-in. H-sections weighing up to 120 lb. per ft. that were

BASEMENT EXCAVATION proceeds in center of site as cut-off wall is constructed around edges. Material removed includes 36,000 yd. in 20-ft. cut to present general excavation level, 5,500 yd. from perimeter cells, 9,000 yd. from boiler room cofferdam, and 19,000 cu. yd. in final 20 ft. cut to bottom of basement slab.

TOUGH FOUNDATION JOB is handled by (left to right) DAN WILSON, superintendent for Raymond Concrete Pile Co.: LESLIE REED, in charge of Walter Reed Corp.'s machine excavation; and GEORGE M. REAVES, project manager for Turner Construction Co., general contractors for building project.

LINE OF CLAMSHELLS excavates perimeter cofferdam of ZP38 steel sheetpiling cross-braced by 10- to 14-in. H-sections. Total of 1,200 sheets weighing 1,350 tons was driven for cofferdam.

STICKY CLAY is cleaned from cofferdam cell with Worthington pneumatic spades and fed to clamshell buckets for removal. Two Worthington diesel-driven compressors totaling 850 cfm. supply air through 2½-in. pipe line around foundation site.



CONTRACTOR'S EQUIPMENT, as well as shops and shanties, are housed in old sidewalk vaults around site. Note 3-in. insulated pipe supplying pile hammers with steam from three 45-hp. boilers on job.

placed as excavation went down. The cells were cut 3 ft. into hardpan, and filled with concrete to the elevation of the bottom of the subbasement floor. Above this level, a thinner basement wall was poured between the outer sheeting and wood face forms placed within the cell. The boiler room cofferdam also was clammed out and braced with two tiers of 16x16-in. timbers and steel wales, and one lower set of steel. Corners were braced by steel beam diagonals.

The center of the lot was excavated to sub-basement level leaving a 50-ft. berm alongside the cofferdam sheeting, and 54 Gow caissons and wood sheeted pits were excavated to hardpan for interior footings. For the Gow caissons, an open-end 6- to 7-ft. dia. cylinder about 8 ft. long, with ⅜-in. wall thickness, was driven, then excavated. A similar shell 2 in. smaller in diameter was driven within the first and, after it was cleaned out, the operations were repeated until hardpan was reached. The bottom was belled out to 12 1/3 ft., concrete was dumped into the caisson, and the cylinders were pulled as the concrete rose within them.

The building will be floored with a 3-ft. sub-basement mat 40-ft. below average curb grade. After the central part of the slab is poured, the walls previously poured within the perimeter cofferdam will be braced to it. Removal of the berm and the interior sheeting above slab bottom will enable the rest of the mat to be poured. Bracing is to remain until all first floor steel and concrete is placed, while the lower portion of the interior line of sheetpiling and the entire outer ring will be left in place permanently.

General contractor for the New England Telephone & Telegraph project is Turner Construction Co., Boston, for whom George M. Reaves is project manager and W. R. Burnes, job superintendent. Raymond Concrete Pile Co., Boston, is foundation subcontractor for all sheeting, shoring, bracing and excavation of cofferdams and caissons, and the Walter Reed Corp. of Boston is handling general machine excavation. Raymond's work is under the general supervision of James Pinnell, with Dan Wilson as superintendent. Leslie Reed is in charge for the Reed Corp. Architects for the building are Cram & Ferguson, Boston, while Moran, Proctor, Freeman & Mueser, New York, are consultants for the foundations.

BOULDERS up to 2 tons, on which cofferdam sheet piles hung up, are drilled and split (below) after excavating cell to that level. Sheets will be redriven to hardpan with free hammer.

GOW CAISSON SHELL (below) is pulled as concrete deposited through elephant trunk rises within. Spreader beam is pinned to shell and is lifted by hand crab on derrick frame above caisson.

DRAFT TUBE FORMS BUILT ON JIGS at Allatoona Dam

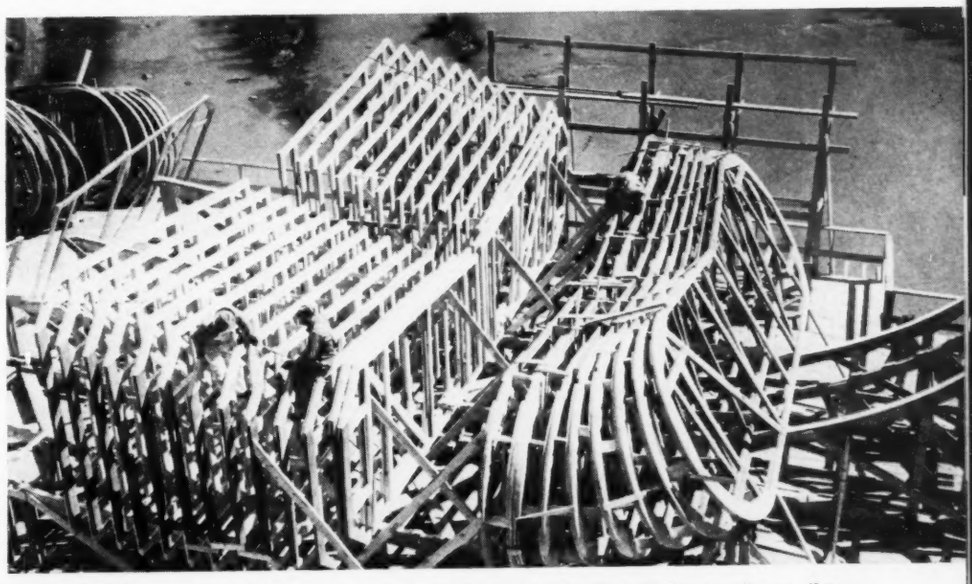
HIGH ON THE RIGHT BANK of Etowah River at Allatoona Dam in Georgia, National Constructors, Inc., have set up a form shop on a trestle jutting out over the steep bluff. Here the complicated forms for the powerhouse draft tubes on the opposite side of the river are cut, laid out and assembled in units that can be transported across the gorge by the job's cableway.

The shop is divided into three parts: at one end is a covered carpenter shop housing band and circular saws where the lumber is cut to shape and length; next is an open layout platform where the ribs are assembled; and the opposite end is the unit assembly area where the ribs are set up on jigs and covered with sheathing.

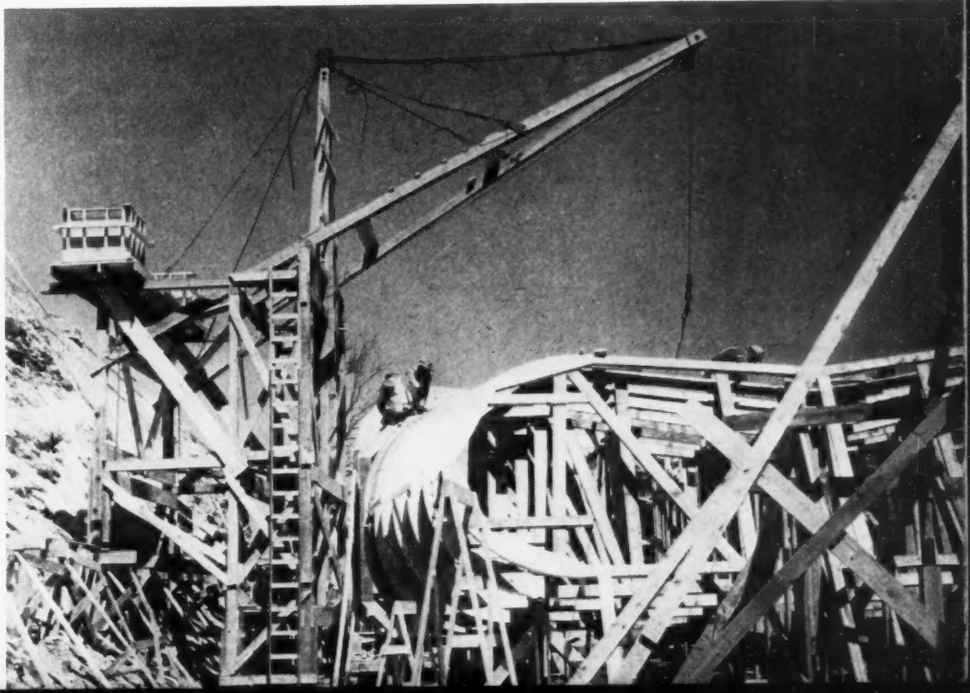
From the jig area, completed form units are lifted by a traveling fixed-boom air-powered A-frame derrick and transferred to a pick-up station for the job's highline cableway for movement across the river to the powerhouse area. The derrick also sets the ribs in the jigs.

Allatoona Dam is being built under the direction of the Mobile District, U. S. Corps of Engineers. Col. Mark Boatner is District Engineer. Charles Jackson is resident engineer at the project, and William N. Evans is project manager for the contractors.

CARPENTER SHOP at one end of form shop platform at Allatoona Dam houses band and swinging-arm circular saws. Here lumber is cut to length and shape for complicated draft tube form sections. Ribs are assembled on floor in foreground.



RIB SECTIONS for draft tube forms are assembled into complicated form units on jigs that space and arrange ribs into desired shapes. Here are three units tacked together into proper shape ready for sheathing.



→

TRAVELING DERRICK lifts ribs into place on jigs and shifts completed form units to pick-up point at end of platform for transportation across river by highline cableway. Derrick is mounted on three rails, one stepped up on sloping bank. Travel and hoist are powered by separate air motors; boom is fixed.

Clever Forms

REINFORCED CONCRETE APARTMENTS for 1,338 low-income families rise skyward at New York City Housing Authority's $13,000,000 Brownsville Houses project. Salamanders on floor below heat freshly poured slab during winter weather. Intermediate ties on special tarpaulins are fastened to form bracing, and upper portion of canvas will be draped over spandrel to direct escaping heat to top of slab.

NYC Housing Authority Photo

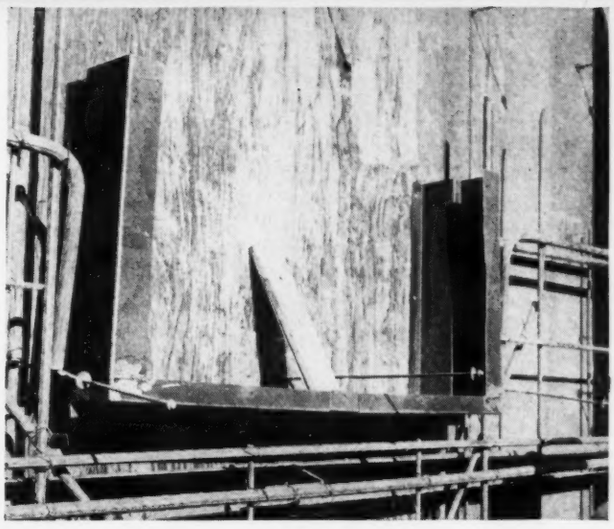
COLUMN FORMS are assembled after wood strip, to which brick-tie inserts are fastened, is wired to 14-gage steel panel. Form halves are held together with ⅜-in. key bolts on 12-in. centers, which enables one man to strip poured column in 8 min. Complete 7-ft. bull-nosed column form weighing less than 100 lb. is assembled by two men in 10 min.

PIER FORMS (below) are the usual plywood with steel column clamps. Piers are all 2 ft. square, but height varies from 1½ to 16 ft. since excavation was carried to various depths as determined by individual tests at site of each footing.

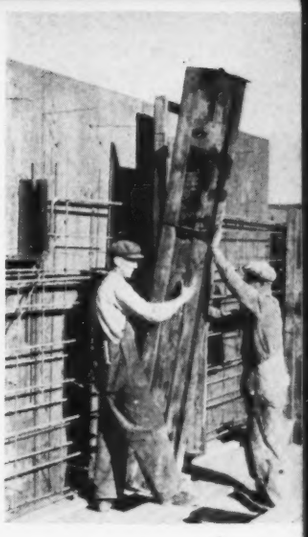
INGENIOUS, SIMPLE FORMS, easily erected and long lived, are the key to speedy and economical construction of 27 six-story reinforced concrete apartment buildings at the New York City Housing Authority's Brownsville Houses project in Brooklyn. The contractors, George F. Driscoll Co. and Moccia Construction Corp., devised practically indestructible full-length sheet-steel column forms that may be erected and stripped in a total of ½ man-hours, and that are easily handled since they weigh less than the steel column clamps of the wood forms which the builders used previously.

Four 7-ft. long, 14-gage L-shaped panels 5¾ in. on

BASEMENT WALL FORMS are ⅝-in. plywood and 2x4 studs made up in 4x9⅓-ft. panels, and are braced with doubled 2x4 wales, and Richmond Snap-tys. Tie spacing, 2 ft. horizontally, simplifies form erection as panel needs to be threaded over only one line of ties at center; other two tie lines fall at panel joints.



SHEET STEEL FRAMES nailed to form panels box out window openings. Complete box consists of four corner pieces, with filler strips between sections to accommodate various size openings and to collapse frame for stripping.



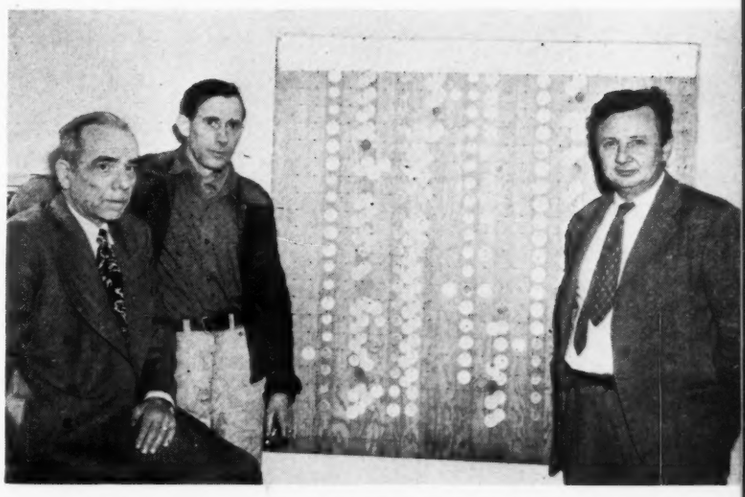
PILASTER FORMS (right) are 14-gage steel bent to L-shape. Bolted together they make 10x16-in. channel section. Form is held in place by wall panel walers that extend over wood studs permanently fastened to sides of metal unit.

MAKE JOB GO AT BROOKLYN HOUSING PROJECT

a side, and with a lip along each edge for bolting, make up a complete form for a 11½-in. square column. Pairs of L's are semi-permanently joined with threaded bolts, and these form halves are key-bolted together for a complete assembly. Wide-radius, or bull-nose, corners on the forms eliminate chamfer strips, and the smooth concrete surface left by the steel forms requires practically no rubbing despite the fact that columns remain exposed in the finished interiors of the buildings.

These column forms are only one of many interesting features developed by the contractors for forming 2,300,000 sq. ft. on the project. Several details are shown in the accompanying photographs.

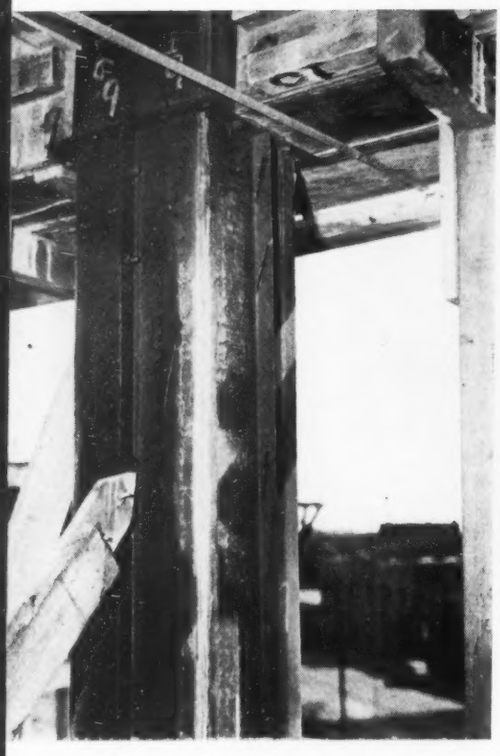
Contractors for Brownsville Houses are George F. Driscoll Co. and Moccia Construction Corp., both



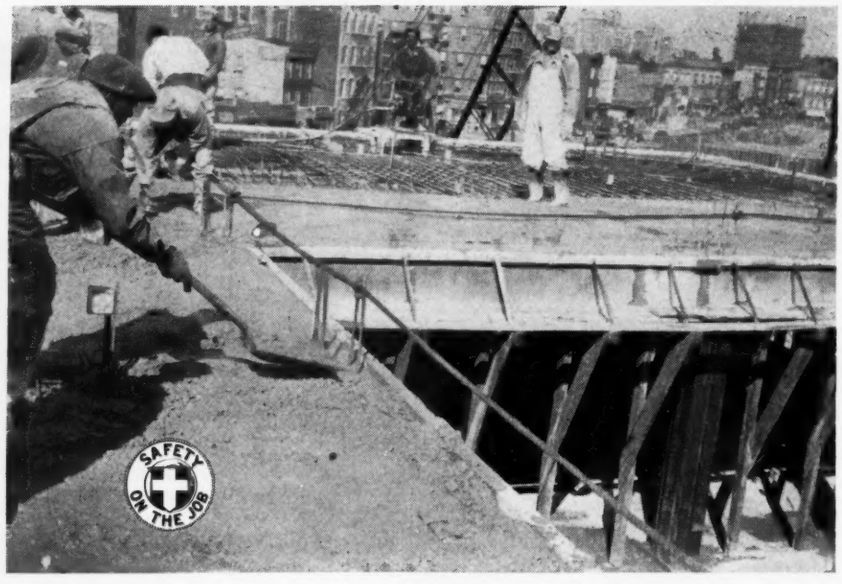
AT CONTROL BOARD where record of job's excellent progress is kept are (l. to r.): **P. L. MOCCIA**, president of Moccia Construction Corp. and project manager at Brownsville job; **JIM THORKILDSEN**, general superintendent; and **R. L. MELLICK**, job engineer for contractor.

FOOTING FORMS (below) are shop-fabricated panels of ⅝-in. plywood on frames of 2x4's. Long pins at corners hold panels together and also spike assembled form to subgrade. Typical footings are 5 ft. square, 16 in. deep.

HOW SINGLE BRACE spiked to floor insert is bolted to form to hold column assembly, is demonstrated by **T. GUNDERSON**, carpenter superintendent. Form bottom is nailed to simple wood collar that is easily knocked out to drop steel form for stripping. Note 1-ft. clean-out panel at base (far side), and channel strip inserted between form halves to spread unit for columns larger than typical 11½-in. sq. size.



EXTERIOR COLUMN is extended with short steel form panel since spandrel is not flush with interior face. Spandrel soffit form is 2-in. plank bolted to lip on column form. Rod shown is hooked over spandrel bracing member and is connected by turnbuckle to mate on opposite side of building to tie all formwork together and prevent movement during pour.

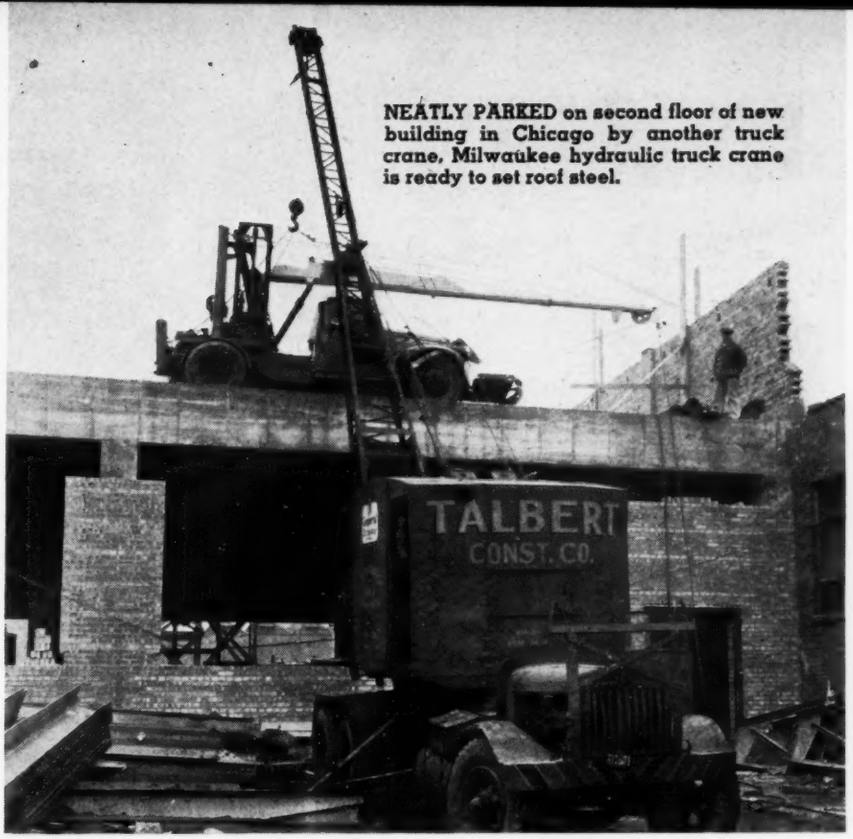


LIGHTWEIGHT ANGLES brace top of plywood spandrel form, which is supported by shores precut to exact length to eliminate wedging. Note safety lifeline fastened to projecting column reinforcing.

of New York City. P. L. Moccia, president of the Moccia firm, is project manager of the joint venture, J. R. Thorkildsen is superintendent, and R. L. Mellick is engineer. John P. Riley is direc or of development and William F. Brostek is chief of construction for the N.Y.C. Housing Authority, which is represented on the project by H. B. Jencks, general superintendent, and Fred C. Hunter, field supervisor. The N. Y. firm of Frederick S. Frost was architect for the buildings and Fred N. Severud was structural engineer.

BRAND NEW air-controlled 40-ton Lima crane with 80-ft. boom and 25-ft. jib hoists ready-mix concrete to 8,000-sq. ft. slab pour. Contractor pours one floor per week in each of 12 to 14 buildings of 27-unit project.

5-IN. FLOOR SLAB is poured (below) on ⅝-in. exterior grade waterproof plywood forms, as Mall vibrator waits to work concrete around reinforcing steel. Plywood, sealed with form lacquer before first use, is thoroughly oiled and wetted before pour to insure minimum life of 16 uses. Special splash lip welded to top of 1½-yd. Insley bucket prevents loss of mix when crane lifts unit from horizontal filling position.



NEATLY PARKED on second floor of new building in Chicago by another truck crane, Milwaukee hydraulic truck crane is ready to set roof steel.

to be raised to the second floor and later lowered to the ground by a General truck crane. The original lift took 28 min., including time for the workmen to learn where to place the slings, and the lowering was accomplished in 15 min.

Maneuverability of the compact truck-mounted unit and precise hydraulic control of all operations of the full-revolving crane, including hoisting, facilitated the erection work. The live boom telescopes in length from 22 to 30 ft. and can be lowered to 7 ft. above ground for low-clearance travel. According to the steel erector, precise hydraulic control of the speed of raising and lowering the load saved much of the time usually consumed in placing trusses and beams.

Poirot Construction Co., Chicago, is general contractor on the Lafayette Steel Corp. job.

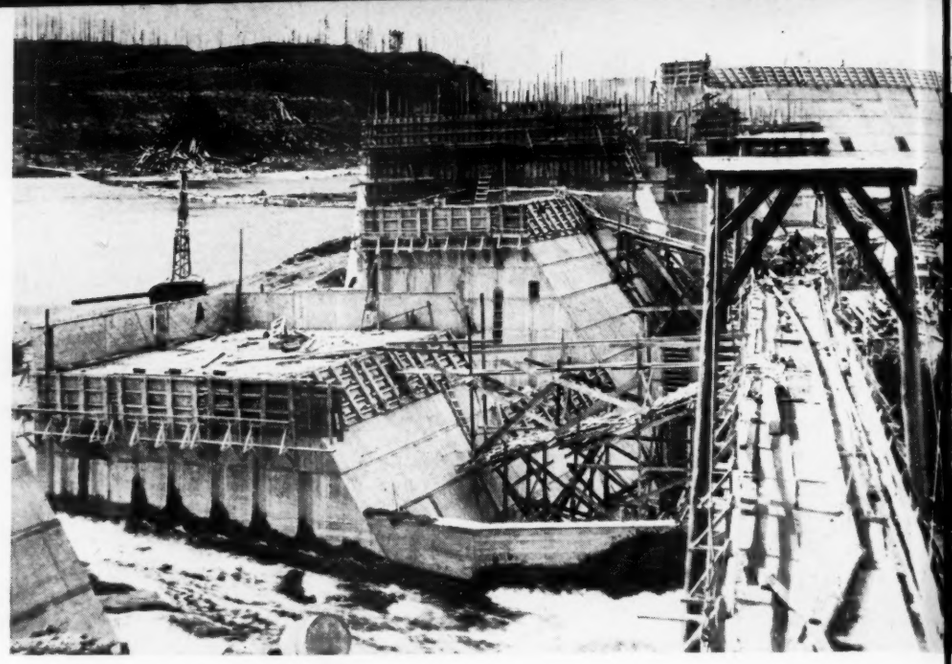
HYDRAULIC CRANE on Second Floor Sets Roof Steel in Hurry

BY HOISTING a Milwaukee 2-ton hydraulic truck crane to the reinforced-concrete second floor of the new Lafayette Steel Corp. building in Chicago, James Hale, steel erection subcontractor, greatly reduced the time required for setting the trusses and roof system. In his words, it would have taken 12 men ten days to erect the roof steel if he had followed the alternative method of using a gin pole. With the hydraulic crane, five men, including the operator, completed the job in 1½ days.

Over the 60x112-ft. second floor area the hydraulic crane erected six 60-ft. trusses, weighing 2 tons each, with intermediate members adding 1,100 lb. to each bay. Trusses were hoisted by the crane from ground level to brick piers at sidewalls, and connecting members were lifted directly from delivery trucks.

Exclusive of truck mounting, the Milwaukee 2-ton hydraulic crane weighs about 4,200 lb. Mounted on a Chevrolet 1½-ton truck, which supplies power for full hydraulic operation through pumps driven by a power takeoff, the complete unit was light enough

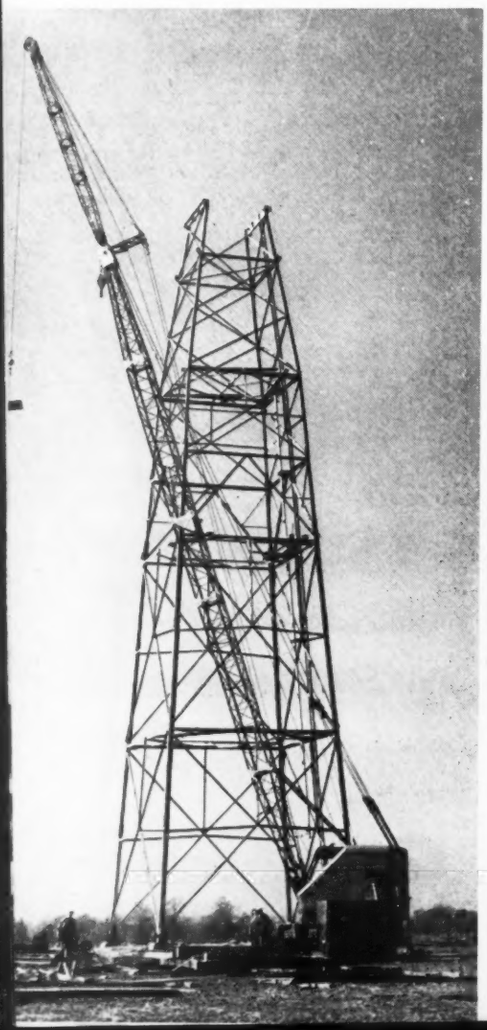
OPERATING ON SECOND FLOOR, hydraulic crane erects roof steel just as if it were running on ground. Rig is full-hydraulic operated through power takeoff from truck drive shaft. Note hydraulic outriggers for heavy loads.



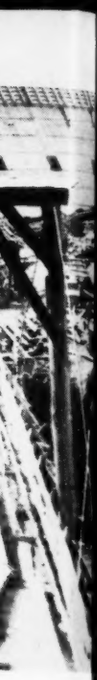
CAMPBELL RIVER DEVELOPMENT, Canada's newest hydro-electric project, nears completion on northern Vancouver Island in British Columbia. Dam, combination concrete and earth fill structure, is being built by General Construction Co., Ltd. Pumpcrete line delivering concrete to left-bank section is carried across diversion channel on log suspension bridge. Powerhouse, 6,000 ft. downstream, is connected to dam by 12-ft. wood stave and steel penstocks.

RADAR TOWER (below) 100 ft. high is erected by Terry Steel Contractors, Inc., at Queens College, Flushing, Long Island. Radar equipment will be set up on platform on top of tower to detect incoming planes at LaGuardia Airport. P&H truck crane with 30-ft. jib on 80-ft. boom sets steel.

STEEL ROOF CONSTRUCTION (right) developed by Britisher, Donald Hamilton, of London, consists of pairs of light channel rafters carrying light steel purlins. Purlins are bolted to rafters in form of ladder and sections are light enough to be handled by one man. Insulating material is laid directly on purlins. British Combine Photo



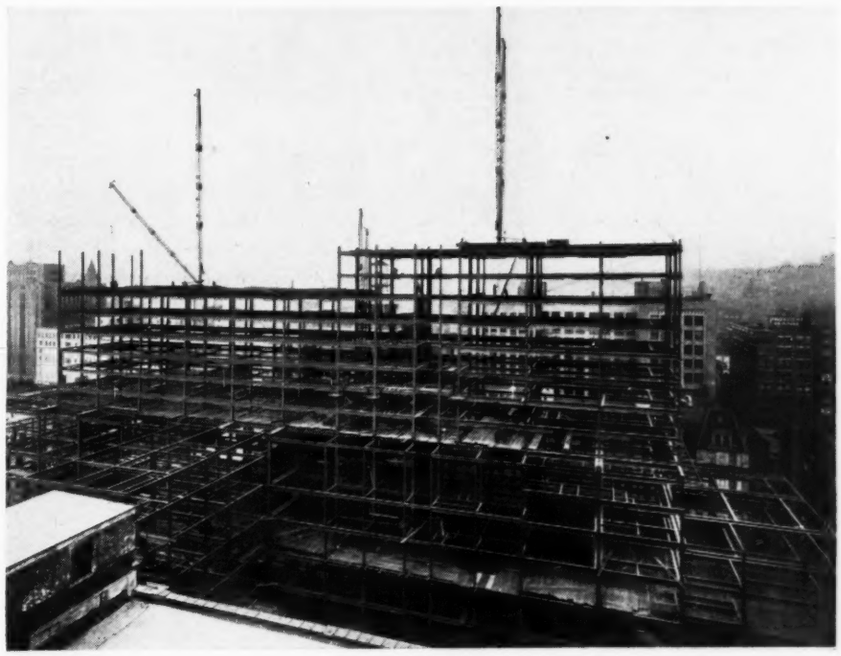
BIG DITCH ON THE COLORADO—Excavation for Davis Dam diversion and forebay channel was nearly finished by Utah Construction Co. when this night photo (below) was taken recently from across river. More than 200 ft. deep, ditch is 75 ft. wide at bottom and some 4,000 ft. long. Side slopes were changed from ½:1 to 1:1 during construction. Next step will be to construct concrete mass spillway 130 ft. thick in foreground at river's edge.



W. W. CALDWELL, president of Caldwell-Scott Construction Co., New York and Ft. Lauderdale, Fla., keeps his eye on boom tip of Northwest crane as rig sets precast 7½-ton cantilever roof slab on roof of new three-story Burdine's department store in Ft. Lauderdale. After slabs were set, Caldwell arranged tour of building for loyal members of Sidewalk Superintendents Club. He was swamped by crowd of 400.

UNDERGROUND GAS STORAGE replaces conventional huge unsightly gas holders at new development of Public Service Co. of Northern Illinois at Kankakee. Tanks are 40-ft. lengths of 24-in. seamless pipe, made by National Tube Co. of ½-in. molybdenum steel plate and swedged down at both ends by forging to 1½-in. threaded pipe connections. Sections, laid end to end in shallow parallel trenches after waterproofing, are joined by 1½-in. welded-connection pipe looped for expansion. Forty tanks at Kankakee store 1,000,000 cu. ft. of gas under 2,240 psi. pressure. Utility is starting another project at Mt. Prospect, Ill., where 1,600 tanks will store 40,000,000 cu. ft. of gas. This view shows tank section being lowered into trench by Insley crane which dug ditches with dragline bucket.

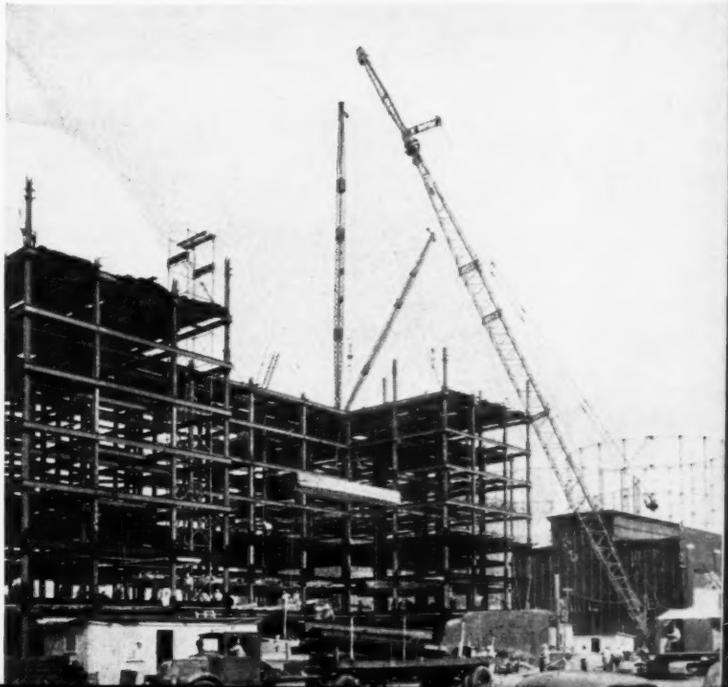
U. S. Steel Photo



ERECTION of 6,200-ton steel skeleton for 18-story Terrace Plaza Hotel and department store building in Cincinnati nears completion as 100-ft. mast, 90-ft. boom guy derricks top out upper stories. Steel erection was by Bethlehem Steel Co. General contractor is Frank Messer & Sons, of Cincinnati.

ACROPOLIS OF ATHENS, 15-century-old Greek citadel, has World War II damages repaired. This narrow-gage railway is being built to move marble replacement pieces up to summit.

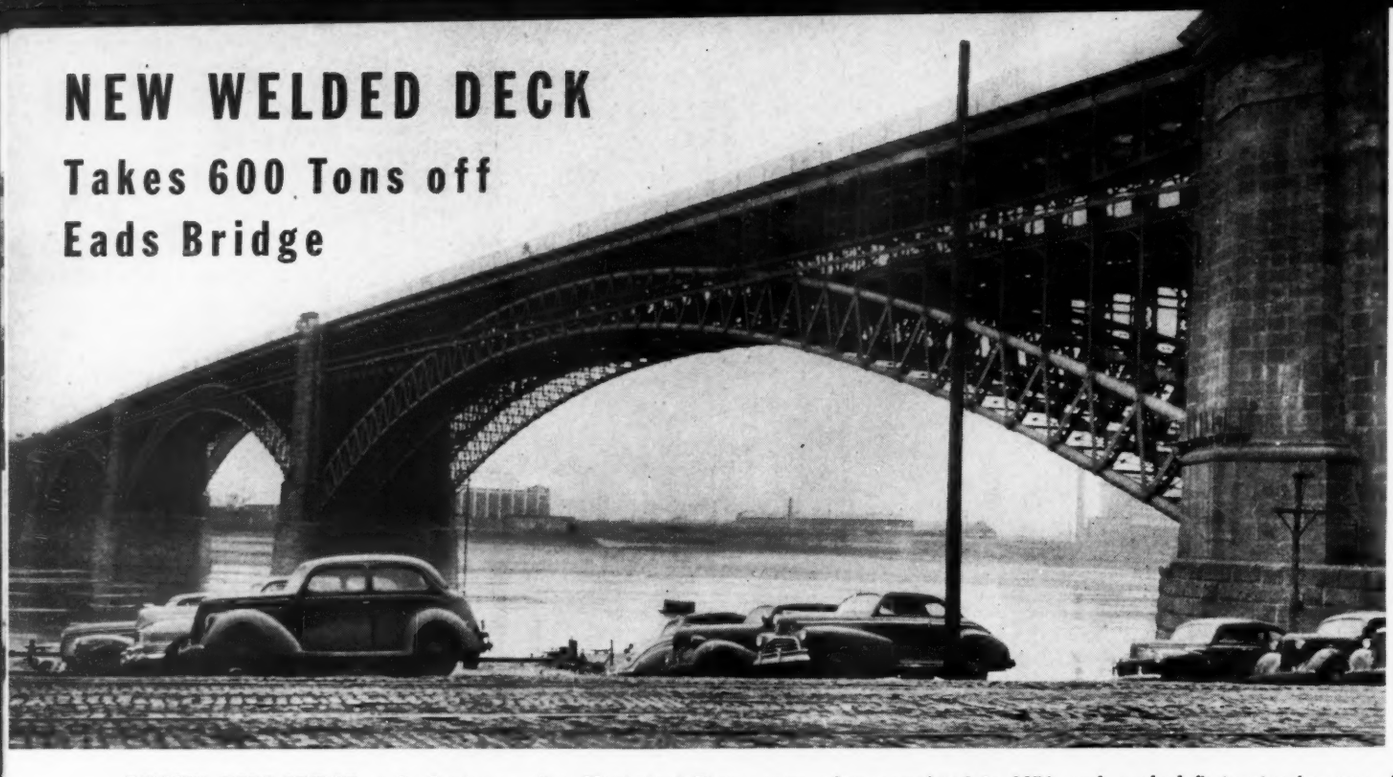
Wide World Photo



ERECTING 45,000 TONS OF STEEL on Metropolitan Life Insurance Co.'s Stuyvesant Town housing project in New York City is job of Bethlehem Steel Co. for Starrett Brothers & Eken, general contractors. Lima crane with 100-ft. boom and 20-ft. jib raises steel for project, consisting of 89 units, including 35 13-story apartment buildings.

NEW WELDED DECK

Takes 600 Tons off Eads Bridge



FAMOUS EADS BRIDGE at St. Louis was first Mississippi River span when completed in 1874, and marked first extensive use of steel and earliest pneumatic caisson pier construction in America. Lower deck of 1,524-ft. structure carries two lines of railroad track, while upper has 4-lane 40-ft. roadway and two 4½-ft. sidewalks.

RECENT RECONSTRUCTION of the highway deck of St. Louis' Eads Bridge, built in 1874 as the first structure to span the Mississippi River, was simplified by field welding floor beam splices and connections to columns, thereby eliminating shop fabrication of steel. William J. Howard, Inc., Chicago, contractor for the job for the Terminal Railroad Association of St. Louis, replaced the existing timber and wrought iron floor system with welded steel floor beams and concrete-filled grating that resulted in a weight reduction of 810 lb. per lin. ft. of bridge, according to the Lincoln Electric Co., Cleveland, who furnished the welding equipment.

The four-lane deck was replaced two lanes at a time to minimize traffic interruptions. After the old deck structure was cut away, new transverse 21-in. I-beams were welded to existing wrought iron columns and to longitudinal girders. Floor beams were made continuous across the width of the bridge by butt-welded splices, with 100-percent penetration obtained by welding from both sides of the joint. In general, two passes of Fleetweld 5 rods welded each joint—usually a 5/32-in. stringer bead followed by a 5/32- or 3/16-in. cover pass.

With floor beams welded, 4¼-in. I-Beam-Lok grating was laid and filled with concrete to form a thoroughly reinforced highway deck. Sidewalks on either side of the roadway were T-Tri-Lok grating. Telephone cables crossing the bridge were incased in pipes with welded joints, and the conduits were embedded in the sidewalk slab as added reinforcing.

Lincoln Electric Co. Photos

FLOOR BEAMS (below) are butt welded after first two lanes of 4-lane span are rebuilt and opened to traffic.

TIMBER AND WROUGHT IRON highway deck (below) is removed and replaced with steel beams and concrete-filled grate flooring. Field welding permits purchase of steel direct from mill and eliminates extensive shop work on multitude of connections.

Bulldozers and Scrapers Strengthened for Tough Job

EARTHMOVING EQUIPMENT on the Corps of Engineers' 16-mi. Pennsylvania Railroad relocation project at the Conemaugh Reservoir site near Pittsburgh, Pa., needs to be bull-strong to handle the sticky gumbo and indurated clay encountered. Bulldozer blades can not stand the gaff when operating as pushdozers. Neither can the four 6-in. channels forming the pusher frame on some 13-cu. yd. carrying scrapers which have cracked at the front edge of the tie plate located just ahead of the pusher block.

Electric Arc Welding—With the aid of a trusty electric arc welder and a little ingenuity, however, strengthening of this equipment was taken in stride by Harry Shaw, master mechanic, and Paul Lenhart, shop foreman, of Hunkin-Conkey Construction Co., Cleveland, and Shofner, Gordon & Hinman, Los Angeles, joint-venturers, who hold a contract for grading and bridge substructures.

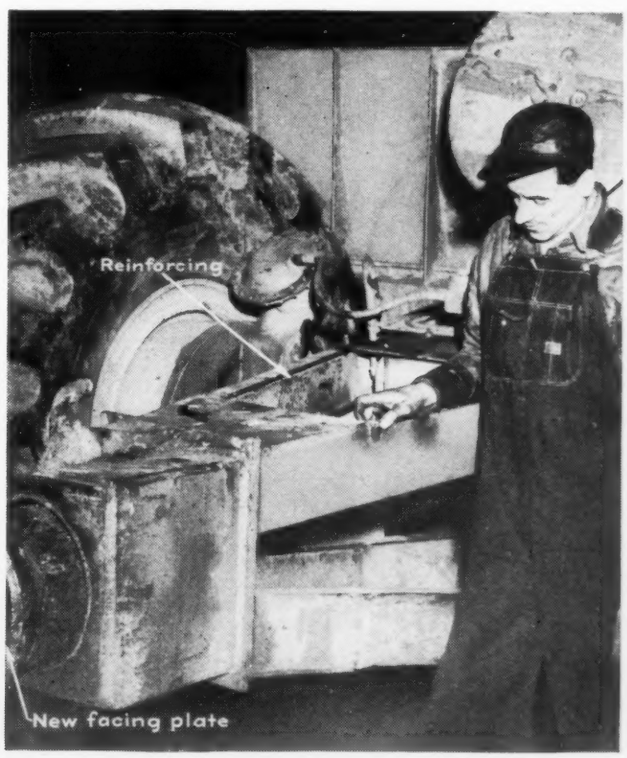
At the first sign of weakness, the bulldozers were hauled into the contractor's shop which, incidentally, is equipped as completely as many a small industrial machine shop. Three ⅝-in. reinforcing plates each 24 in. wide by 36 in. long were welded to the front face of each blade. They were set ¾ in. below the top edge and covered the central 6 ft. of blade to give a wide area of contact with the pusher blocks on the scrapers. Edge-welds at the top, sides and bottom were ⅝-in. fillets; those between the plates were 3/16-in. buttwelds, without edge preparation.

Snug Fit Essential—The crux of the entire operation lay in getting a snug fit between reinforcing plates and bulldozer blades. To do this, each plate was bent to a lesser radius (sharper curvature) than that of the blade. Next step was to tack weld the plate along the bottom edge, leaving the top sprung about 1 in. away from the blade. An angle-iron gusset was welded to the top of the bulldozer blade with the downstanding leg about 1 in. in front of the reinforcing plate. A 2-in. hardwood wedge then was driven horizontally between the gusset and reinforcing plate to force the latter firmly against the blade, ready for final welding.

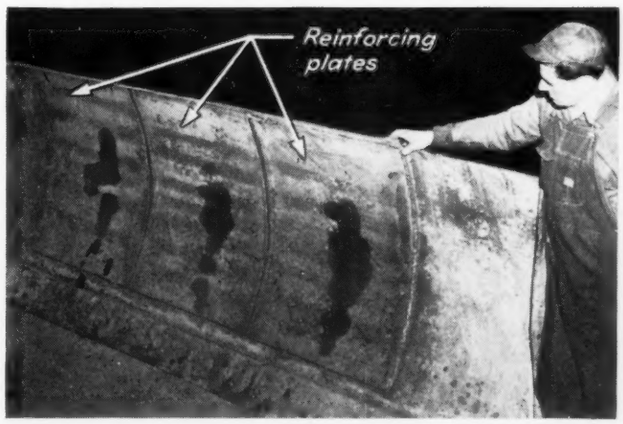
Boxed Channels on Scrapers—Strengthening the pusher frame on the carrying scrapers was much simpler, but equally effective. Each of the four 6-in. channels extending from the rear axle back to the pusher block was converted into a "box" section by welding a 5½x⅜-in. plate between the toes of flanges. These plates also extend from axle to pusher block, with continuous welds along both edges. As an added precaution, a ⅞-in. facing plate also was welded to the pusher block on the scrapers.

No cost data were available on strengthening the bulldozer blades or stiffening the carrying-scraper pusher frames, but the shop foreman reported that the savings in lost time from equipment breakdown exceeded many times the shop costs of making the equipment "bull-strong."

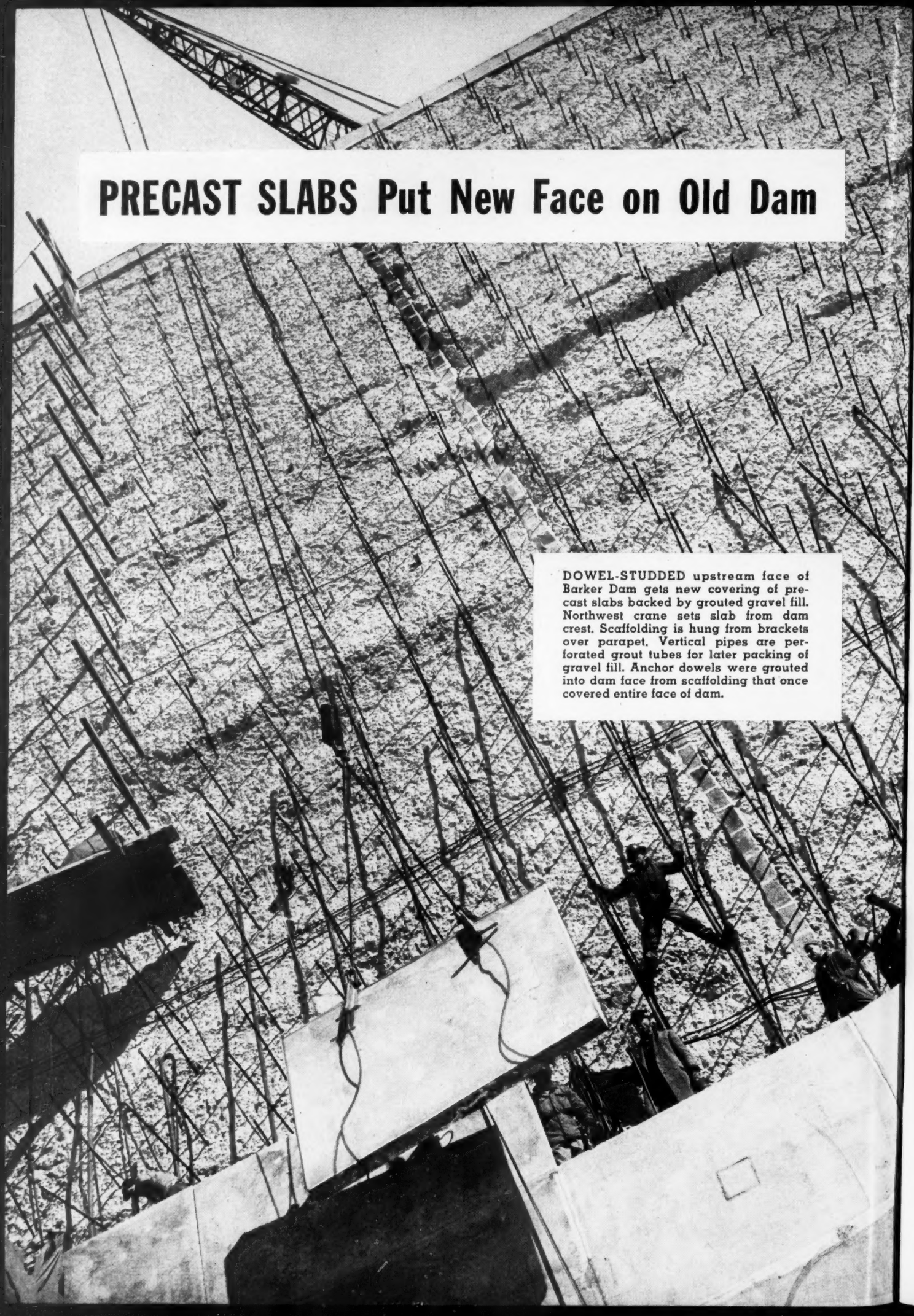
CHANNEL FRAMES for pusher block on carrying scraper (right) are "boxed" with welded plates to prevent cracking of channel flanges.



BULLDOZER BLADES (below) are reinforced with welded facing plates to prevent bending under heavy push-loads.



PRECAST SLABS Put New Face on Old Dam

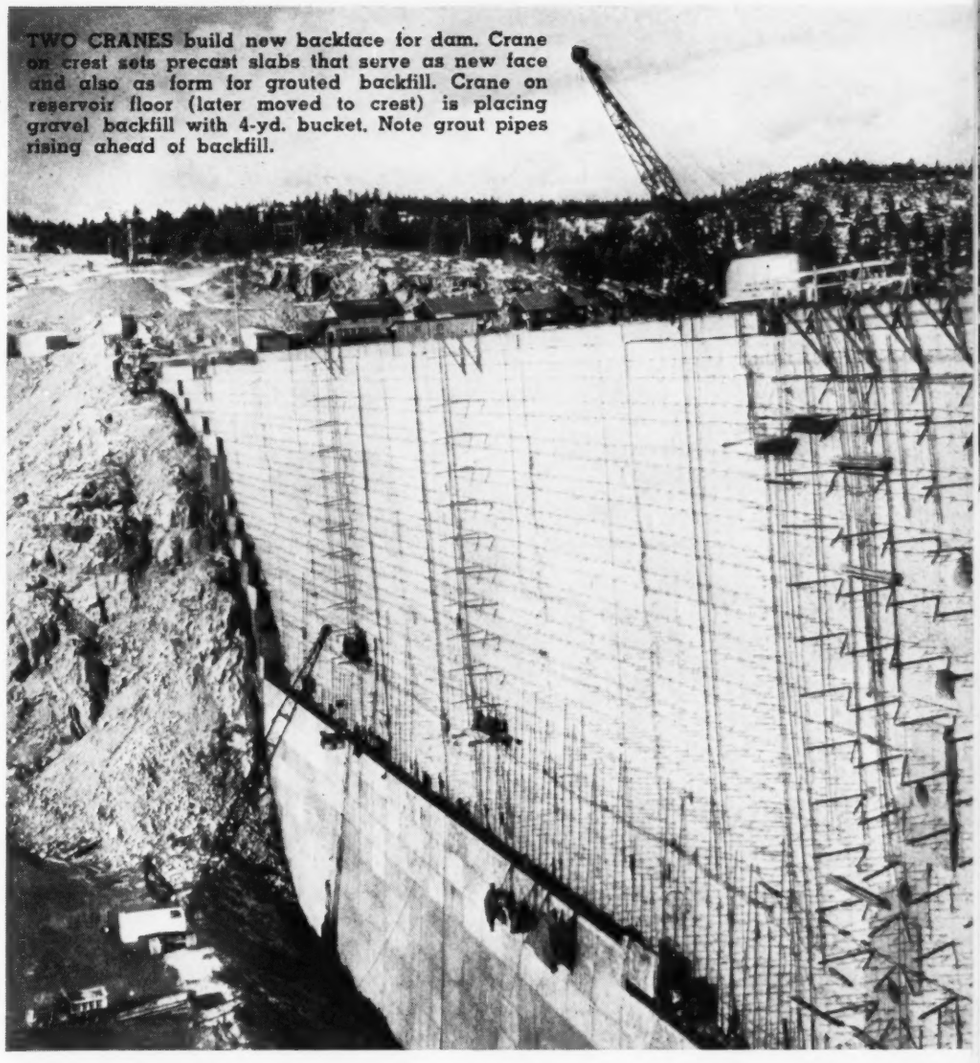


DOWEL-STUDDED upstream face of Barker Dam gets new covering of precast slabs backed by grouted gravel fill. Northwest crane sets slab from dam crest. Scaffolding is hung from brackets over parapet. Vertical pipes are perforated grout tubes for later packing of gravel fill. Anchor dowels were grouted into dam face from scaffolding that once covered entire face of dam.

BARKER DAM, a 38-year-old concrete structure 175 ft. high in Boulder Canyon just below Nederland, Colo., is getting an upstream face-lifting by an ingenious process of grouting gravel fill behind a combination face-and-form of precast concrete slabs. Prepakt Concrete Co., Cleveland and Chicago, is doing the work for Public Service Co. of Colorado. Barker reservoir is water storage for the utility's high-head hydro plant 15 mi. down the canyon.

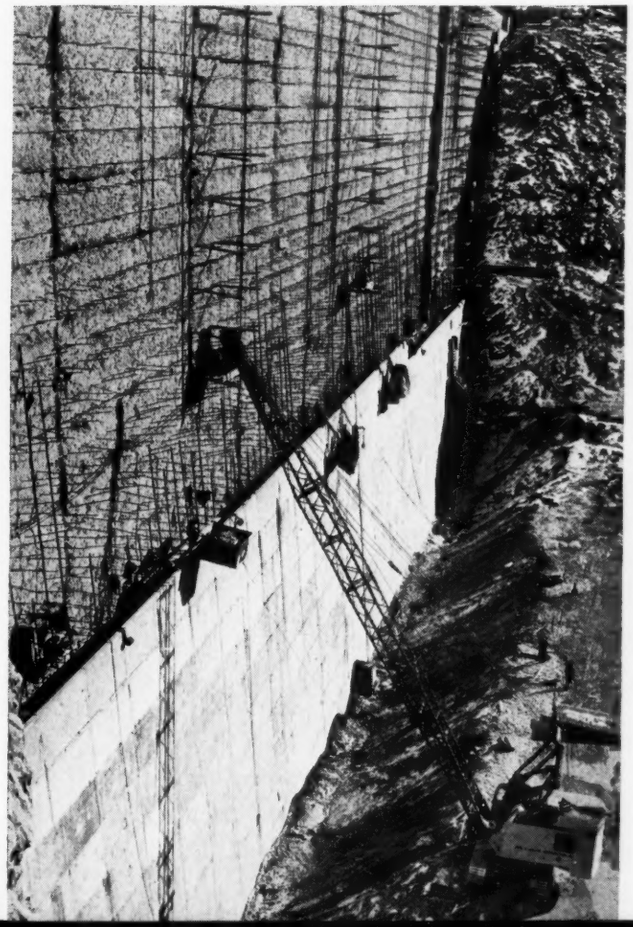
Ice and frost damage through the years had caused excessive scaling of the upstream face of the dam. When major repairs were considered necessary, the engineers decided also to increase the thickness of the structure. The prepack process is ideal for this dual purpose, for it is designed to produce concrete with low shrinkage and high bond value.

The reservoir was drained dry through a tunnel driven through the dam from the downstream side at lowest point. This was later closed and the small flow of Boulder Creek was then diverted by pipes through the regular outlet

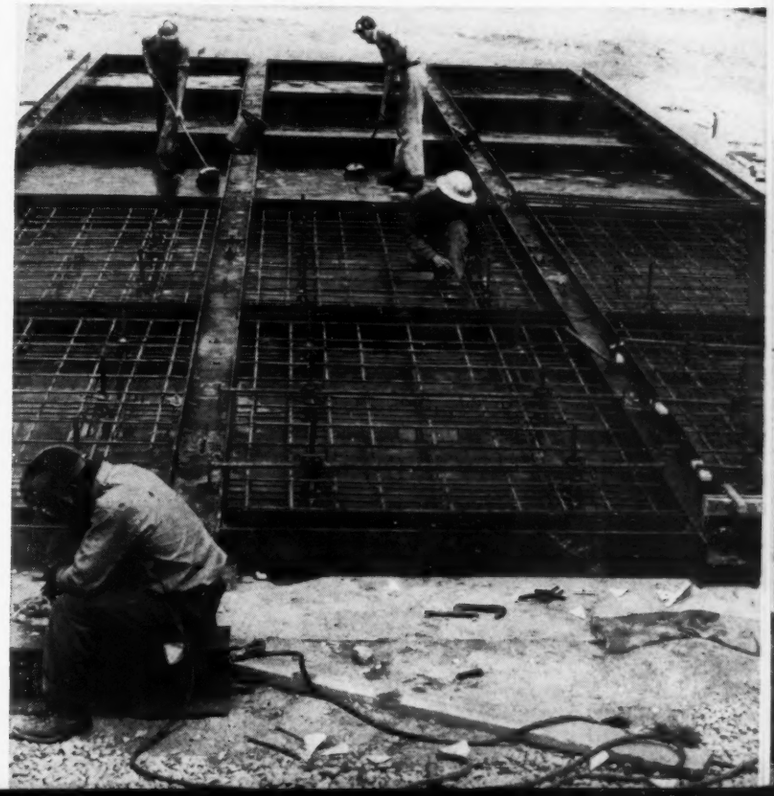


TWO CRANES build new backface for dam. Crane on crest sets precast slabs that serve as new face and also as form for grouted backfill. Crane on reservoir floor (later moved to crest) is placing gravel backfill with 4-yd. bucket. Note grout pipes rising ahead of backfill.

LONG-BOOM NORTHWEST CRANE (below) places gravel backfill as another rig sets slabs from above. Horizontal timbers are scaffold supports hung from brackets at dam crest.



STEEL BEAMS on concrete platform (below) made up simple forms for casting over 1,000 slabs for backwall. Anchor dowels are assembled as part of reinforcing cage.



works above foundation level. All scaling was chipped off and the original face was roughened well into sound concrete. Then dowels were grouted into the dam as ties for the new face. Timbers hung from brackets over the parapet served as scaffold supports for this work.

More than 1,000 slabs, each about 6½x12 ft. in area and numbered for position in the wall, were cast on a flat above the crest of the dam. Simple forms, resting on concrete platforms, were wide-flange beams laid on the flange edges. Anchor dowels, to correspond with those in the dam, were cast into slabs as part of the reinforcing cages.

Two Northwest crawler cranes, rented by Prepakt from John R. Austin Construction Co., handle all the slabs and place the gravel fill. One crane, operating from the dam crest, erects the slabs in a vertical wall. Slabs are set in mortar, and as each unit is placed, it is firmly anchored by welding the slab and dam dowels together. The second crane backfills the wall with gravel as fast as a course of slabs is set. At first this crane worked from reservoir bottom, but after the limit of its 60-ft. boom was reached, it was moved to the crest. Gravel is placed with a 4-yd. bottom-dump skip. Perforated vertical grout pipes, continuously extended by welding, are carried ahead of the gravel fill. Packing the gravel with a special grout will be done after the facing is complete.

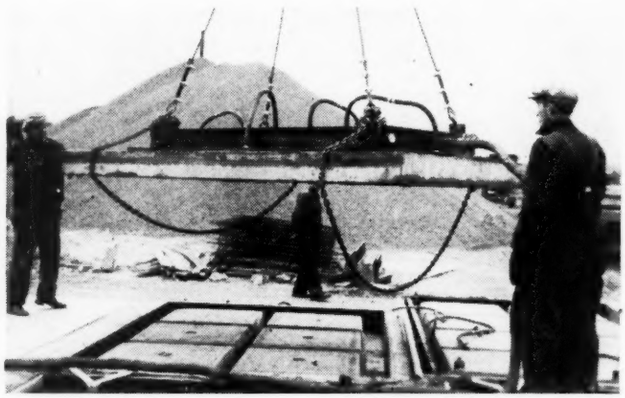
John Hofer is general superintendent for the Prepakt Concrete Co. Raymond E. Davis, Berkeley, Calif., is consultant for the Public Service Co. of Colorado, and E. Clinton Jansen is chief hydraulic engineer.

Just in Case.....

Safety Slings Supplement Vacuum Pads in Lifting Panels

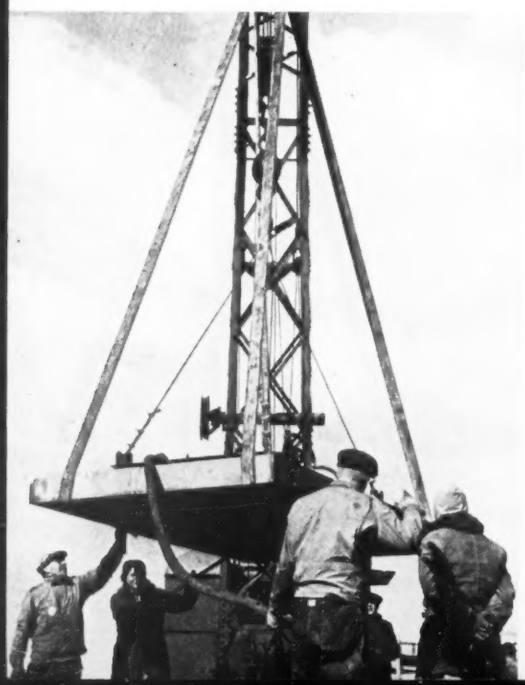
A PRIME FEATURE of the Savings Bank Trust Co.'s Parkway Village housing development in New York City for United Nations personnel, is the precasting of 6,800 reinforced concrete floor slabs at the site in concrete molds. Slabs are lifted from the forms by vacuum pads handled by crawler cranes. To prevent injury to workmen or damage to the slabs, the general contractor for the job, George A. Fuller Co., New York, in conjunction with the State Department of Labor, developed safety slings to supplement the vacuum lifters and hold the concrete panel should suction pump or line fail.

Safety slings of wire rope, chain or canvas belting are slipped beneath the slabs after the vacuum lifter has raised them a foot or two above the molds. Originally, chain slings were draped around the slab and fastened to the steel frame of the lift pad, but Fuller now uses canvas or cable slings from the whip line of the handling crane.



VACUUM LIFTING PAD (above) raises concrete floor slab from waffle-shaped precasting mold. Chain slings were early safety measure to prevent slab dropping in event of suction failure.

Photos from N. Y. State Dept. of Labor



→ **WIRE ROPE SLINGS from crane's whip line are slipped beneath slab after vacuum lifter raises unit slightly from mold. Suction lifting pad operates under vacuum of 15 to 25 in. of mercury.**

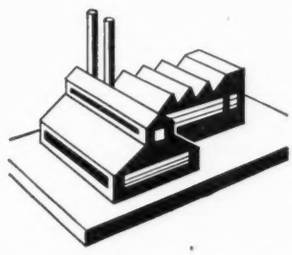
← **CANVAS BELTING is improved safety device to supplement suction lifting pad. Ribbed floor slabs are precast in panels up to 16 ft. square and weigh average of 31 lb. per sq. ft.**

LEGAL ADVENTURES OF TRACTOR CONN

By LESLIE JOBB

By recounting the experiences of Tractor Conn, who symbolizes the average contractor, this series of articles, each based on the decision of an American court and presented in plain, non-legalistic terms, is designed to help construction men avoid costly legal pitfalls.—Editor

The Case of the Altered Contract



Doe was selling a partly completed plant to Roe.

"It's subject to Tractor Conn's lien for $50,000," Doe explained. "He built it, you know."

"I'll buy subject to the lien," Roe agreed and the sale went through on that basis.

Then Doe and Conn changed this contract so that Conn was entitled to $55,000. Roe refused to pay the extra $5,000.

"You bought subject to my lien," Tractor Conn pointed out.

"Yes, but only subject to your lien under the contract as it read when I bought," Doe retorted and the California courts ruled in his favor in a case reported in 7 Cal. 575.

The Case of the Printed Form

Tractor Conn's building contract was on a regular form containing a printed clause in the following words:

"Payment to be made on the final completion of the work, and on the architect's certificate that the work has been done according to this contract and to his satisfaction."

A written clause in the same contract read as follows:

"The contract price herein specified is to be made in six equal monthly payments, on the certificate of the architect that the completed portions of the work conform to this contract, and have been done to his satisfaction."

At the end of the first month Tractor Conn presented the required architect's certificate and demanded one sixth of the contract price, which the owner refused to pay.

"The contract provides that nothing is payable till the work is completed," the owner pointed out.

"Yes, the printed part does," Conn admitted, "but the written clause specifies monthly installments, and the writing will prevail over the printing."

"Where a contract is written in part and printed in part, as where it has been filled in upon a printed form, the parties usually pay much more attention to the written parts than to the printed parts. Accordingly, if the written provisions cannot be reconciled with the printed, the written provisions control," said the Wisconsin Supreme Court in deciding in Tractor Conn's favor, and the Alabama, California, Colorado, Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, New York, Pennsylvania, Texas and Washington rulings are to the same effect.

The Case of "Purchase Money Mortgage"

Doe, like the man in the parable, had started a house, was not able to finish it, sold to Roe, and took a "purchase money mortgage" from Roe to secure the balance of the purchase price.

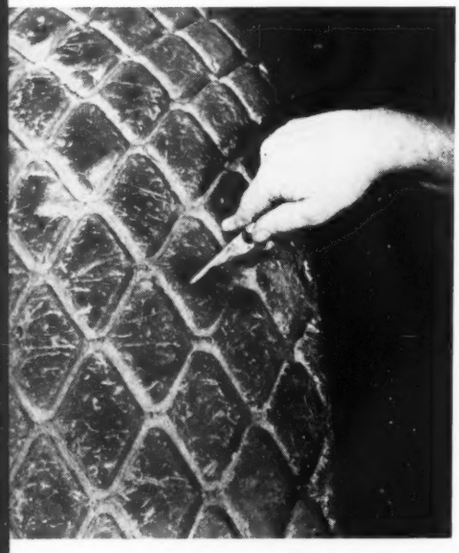
Then Roe employed Tractor Conn to complete the building, failed to pay according to agreement, and Conn filed a lien against the building.

"My mortgage was recorded first," Doe pointed out.

"My work increases the value of the mortgaged property and my lien ranks first," Tractor Conn maintained, and the Pennsylvania courts ruled in his favor in the case of American *vs.* Pringle, L.S.&R. (Pa.) 138, although in the absence of special circumstances the general rule is that a purchase money mortgage ranks ahead of a subsequent mechanic's lien.

More Legal Adventures of Tractor Conn Next Month

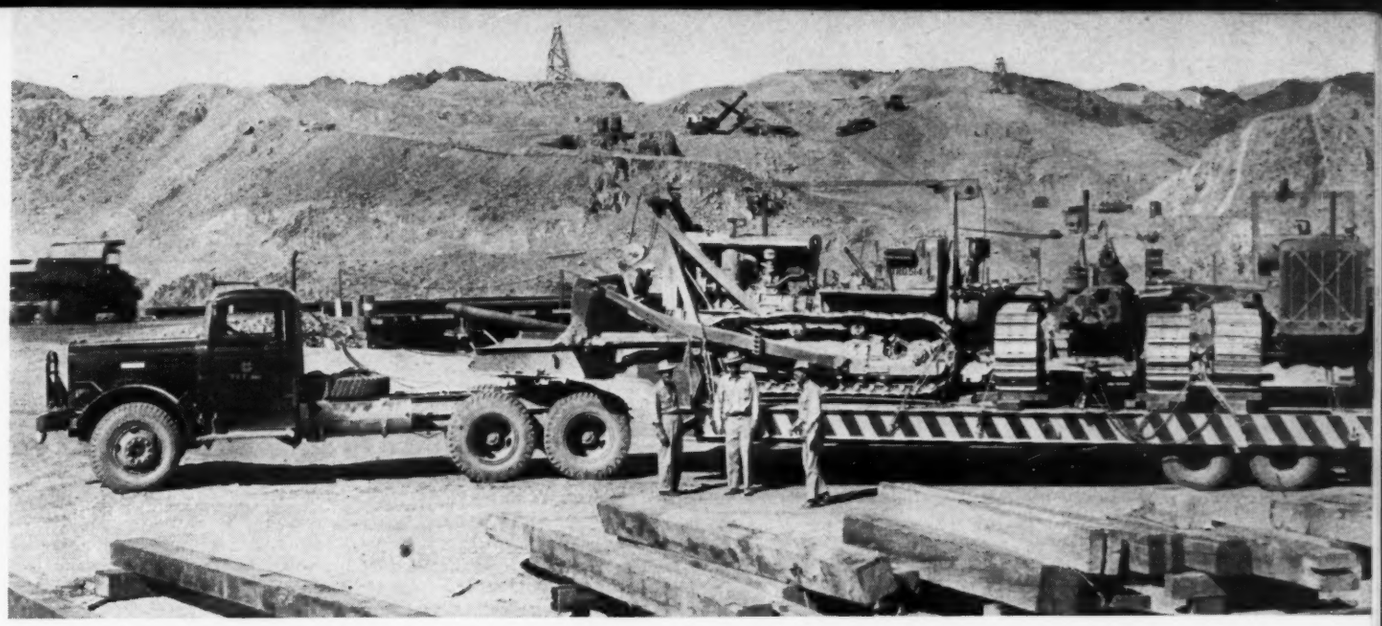
SPECIAL TOOTHED ROOTING BLADE on International TD-14 crawler tractor gets purchase on roots of stumps beneath soil in land clearing operations of L. J. Carter of Monroe, Wash. Crawler is equipped with Isaacson hydraulic Tracdozer which has Klearing blade in place of usual dirt blade. Roots are torn out by using power of hydraulic system and Isaacson WO-14 winch mounted on rear of tractor drags big stumps to burning piles.



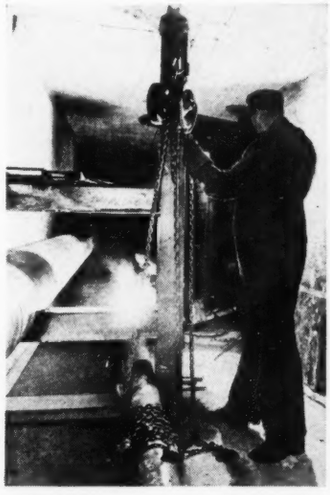
FOR SUCCESSFUL non-vulcanized repair of tire tread cuts that do not penetrate fabric, Goodyear Tire & Rubber Co. recommends probing cut to remove foreign matter, then trimming or grinding around cut to form cone-shaped cavity extending to bottom. Bevel should not be more than 30 to 45 deg. nor extend deeper than breaker. Cavity prevents wedging of stones that work way through tire causing serious damage. Shallow cut itself is not detrimental to tire life.

HOW ...they did it

BUSIER than a cat on a tin roof is this versatile Caterpillar D-2 (below) equipped with Trackson shovel and Hyster crane working for M. J. Lynch on Pine Street sewer in San Francisco. Rig backfills section of sheeted trench, then turns around and pulls sheeting.



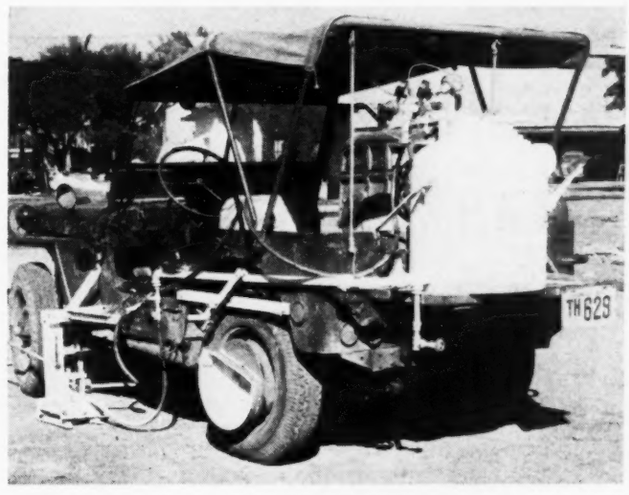
THREE TRACTORS arrive at Davis Dam on one trailer after 34-mi. ride from nearest railhead at Kingman, Ariz. Utah Construction Co. moves all heavy equipment to job on lowboys such as this. Excavation for forebay channel is under way in background.



← **ROLL WELDING** of pipelines in tunnel is made simple by wrapping load lines from two chain hoists around pipe section to be welded. Then pipe may be turned to constant top welding position by operating hoist. Simple, isn't it? Thank Air Reduction Sales Co. for the idea. And, of course, this welder is using Airco 78-E all-position electrodes.

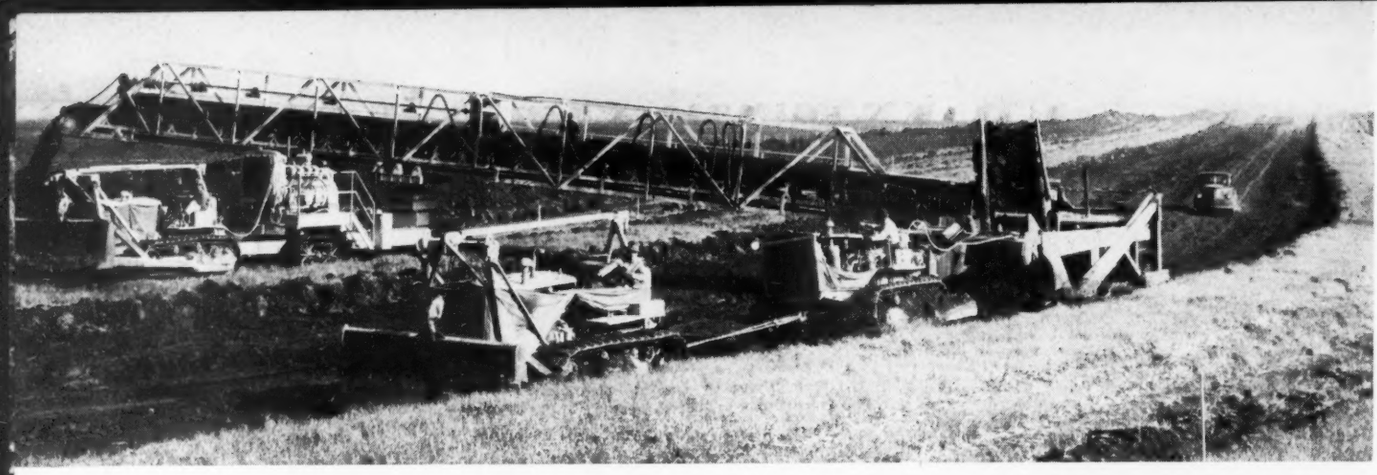
→ **SPECIALLY RIGGED JEEP,** carrying 25-gal. paint tank, stripes 4 mi. of road an hour in Hawaii. Pointer lined up with wheel and paint gun keeps jeep on straight track.

Photo by Hawaii Territorial Highway Dept.



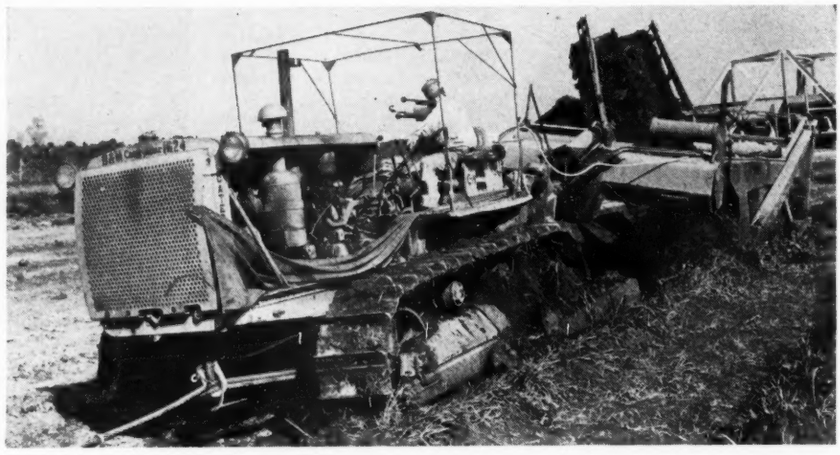
ANGLE IRONS welded to bottom and cab roof of Euclid 11-yd. end-dump trucks (below) reinforce truck bodies for heavy rock hauling on National Constructors, Inc., Allatoona Dam job on Etowah River in Georgia.

TWO EXTENSION TEETH (below, right) attached to bucket of truck-mounted dragline make quick work of removing Russian thistle weeds from irrigation canals. Plan was devised by Harry J. Whetmore, Bureau of Reclamation watermaster, and Ray R. Johnson, dragline operator, on Roza division of Yakima project. Each tooth was made from two pieces of ⅝-in. steel 3 ft. long. Steel pieces were fitted over dragline tooth to meet at point and were welded together to form single tine. Teeth extend 24 in. beyond bucket.



COMBINATION LOADER-STACKER digs Friant-Kern Canal in California. Rig consists of Euclid loader pulled by D8 tractor, and traveling belt conveyor supported on two crawler-mounted carriages, one under receiving hopper at right, other under truss frame of stacker, each pulled by separate tractor. Tandem hitch shown here on two tractors at right was changed later to cable hitch from front tractor passing beneath rear tractor and loader to loading end of stacker.

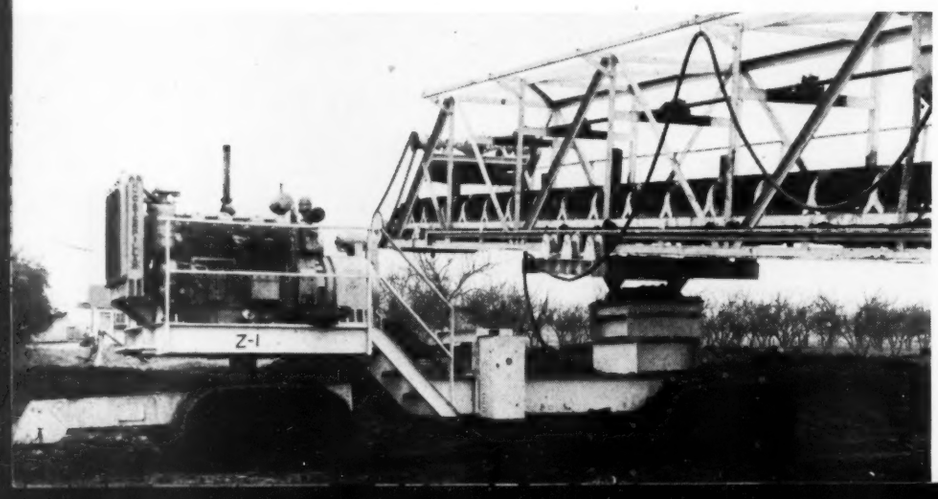
"RUBE GOLDBERG" LOADER-STACKER DIGS Friant-Kern CANAL



EUCLID LOADER, pulled by D8 tractor, feeds belt stacker at average rate of 1,200 cu. yd. per hr., though output has reached 1,750 cu. yd. per hr. Cut for each pass of loader is 18x36 in. This view shows revised hitch of lead tractor passing beneath loader and its tractor.

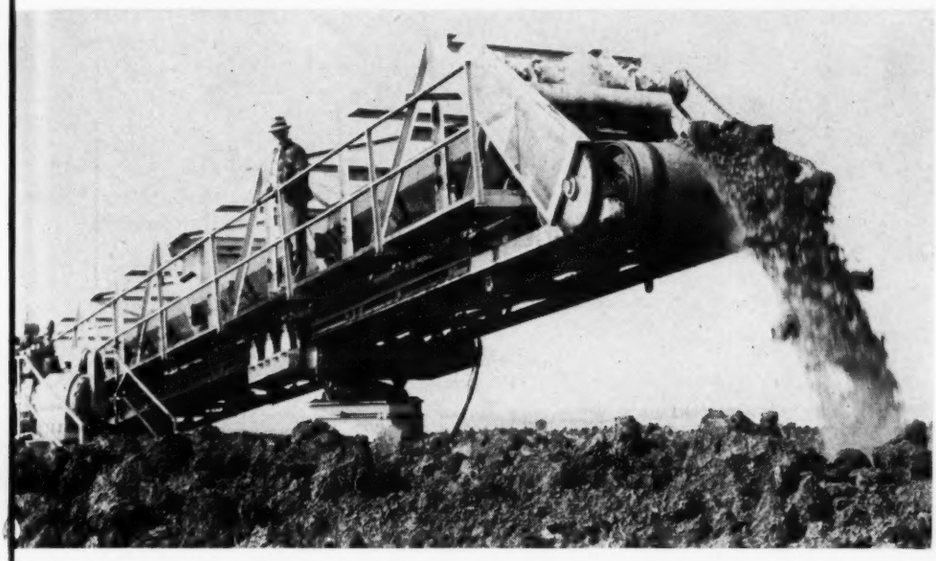
DUBBED the Rube Goldberg Excavator, after the series of famous cartoons depicting mechanical monstrosities, an odd new type of dirt mover is digging a section of the Friant-Kern Canal on the U. S. Bureau of Reclamation's Central Valley project in California. Built by Guntert & Zimmerman, Stockton, Calif., for Arizona-Nevada Constructors, Inc., contractors on a 40-mi. length of the canal, the machine is far from the fantasy its name implies. Actually, it is an ingenious combination of the new Euclid loader and a traveling belt-conveyor stacker that casts the spoil 100 ft. from point of excavation.

The stacker is a trussed section 100 ft. long, carrying a 60-in. belt, and supported on two swivel-head crawler carriages. One carriage is under a receiving and feeder hopper at one end of the stacker. The other carriage, besides being swiveled, also carries a roller assembly that engages a track under half the length of the truss. This second carriage also houses a Caterpillar D17000 diesel generator that supplies power to the electric motor driving the belt. Each carriage



CARRIAGE supporting outer end of stacker also carries diesel generator that furnishes power for conveyor belt electric motor. Carriage support rolls along bottom of trusses to raise or lower stacker discharge end. Double-pivoted carriage is pulled by D8 tractor.

LOADER end of stacker, mounted on swivel carriage, carries receiving and feeder hopper. Steering tongue connects carriage with its towing tractor.



AS STACKER RESTS on two pivoted supports, discharge end can be moved at will to regulate distance spoil is dumped from loading line, and can be lowered or raised by changing position of roller-mounted truss support.

is pulled by a Caterpillar D8 tractor.

The Euclid loader, pulled by a third tractor, discharges into the hopper. When the machine is operating, the tractor pulling the hopper end of the stacker works ahead of the loader tractor through a cable hitch passing beneath the loader and its tractor.

Height of discharge end of the stacker can be varied by moving the truss support carriage toward or away from the loading end. Distance of discharge from loading line can also be varied by changing the horizontal angle between line of cut and stacker.

The canal section on this contract runs up to 18 ft. deep and varies in bottom width from 36 to 60 ft. The rig is operating on a 6,300-ft. run, making four round trips in an 8-hr. shift. Each pass of the machine cuts a trench 18 in. deep and 3 ft. wide. Output, steadily increasing, averages 1,200 cu. yd. per hr., though a maximum performance of 1,750 cu. yd. per hr. has been reached. Cuts for half the width of canal are made without turning the stacker at end of a run, merely turning the two carriages and the loader. To switch to the other half of bottom cut, the stacker is turned around for discharge on to the opposite bank.

L. G. Lynch is project manager for Arizona-Nevada Constructors, Inc., who have offices in Phoenix, Ariz., and Dinuba, Calif.

MOLES ELECT CHARLES B. SPENCER AS PRESIDENT

THE MOLES, New York society of tunnel and heavy construction men, chose Charles B. Spencer as president for the coming year at their annual meeting May 7. Spencer is vice-president of Spencer, White & Prentis, Inc., specialists in underpinning and foundation work since 1919.

Other officers elected at the same time include: J. Rich Steers, Jr., J. Rich Steers, Inc., first vice-president; Carlton S. Proctor, Moran, Proctor, Freeman & Mueser, second vice-president; Edward J. Mahoney, Mahoney-Clarke Co., sergeant-at-arms; William W. Hanly, Jr., The Hanly Co., secretary; and Ralph W. Atwater, Shultz Dredging Co., treasurer.

New trustees are David Bonner, Frederick Snare Corp.; William A. Durkin, Walsh Construction Co.; Thomas A. Scott, Merritt-Chapman & Scott Corp.; Bertram L. Swett, Lehigh Portland Cement Co., and outgoing president Alfred N. Warwick, Eugene F. Warwick, Inc.

MOLES' GAVEL changes hands (below) as retiring president ALFRED N. WARWICK (left) presents symbol of office to CHARLES B. SPENCER, who heads society for coming year.

BRITAIN BUILDS 13,000 PREFAB CONCRETE HOUSES

PRECAST CONCRETE SLABS 3 ft. long and 9 in. wide are set between concrete posts and anchored by copper wire ties to inclose structure. This view shows construction of party-wall separating halves of two-family house.

By
JOAN LITTLEFIELD
British Information Service

THE AIREY prefabricated concrete house, described by the British Ministry of Health as a permanent dwelling equal in standard and quality to a traditional type of home, is to be mass-produced and distributed to rural areas of Britain. Already 13,000 houses are on order from the present production program of 20,000.

The Airey—so-called after its designer, Sir Edwin Airey of Leeds—is a two-family, two-story semi-detached unit with a tiled pitched roof or a flat roof. It is a house of precast concrete units, economical in timber, simple to erect, requiring no cranes and little scaffolding. Each half of the two-family unit measures 27x19½ ft. in plan; a party wall separates the two halves of each house. A contractor with no previous experience in this type of construction can put up the superstructure of a pair of Airey houses in approximately 410 man-hours, including time for unloading the components at the site. Unskilled labor can be used to erect these structures since no "wet" trades are necessary. The superstructure includes framing and sheathing, forming a shell ready to receive the roof.

The Airey is traditional in structural form, resembling the simplest type of timber construction. A concrete slab forms the ground floor of the structure. Precast concrete posts and panels take the place of timber posts and sheathing, and these are vibrated and reinforced in precision metal molds. In factories throughout England the panels are produced in various textures to blend with the rural surroundings of each group of houses. The pitched roof can be finished with tiles or other standard materials. A flat roof can also be provided as part of the structure, using metal joists.

There are both North Aspect and South Aspect type Airey houses, both erected from the same standard set of components. The total superficial floor area of the North Aspect House is 945 sq. ft. Outbuildings provide another 118 sq. ft. The two types are designed to enable the large rooms to face south, the North Aspect having its entrance hall to the road, while the hall of the South Aspect faces the end of the pair.

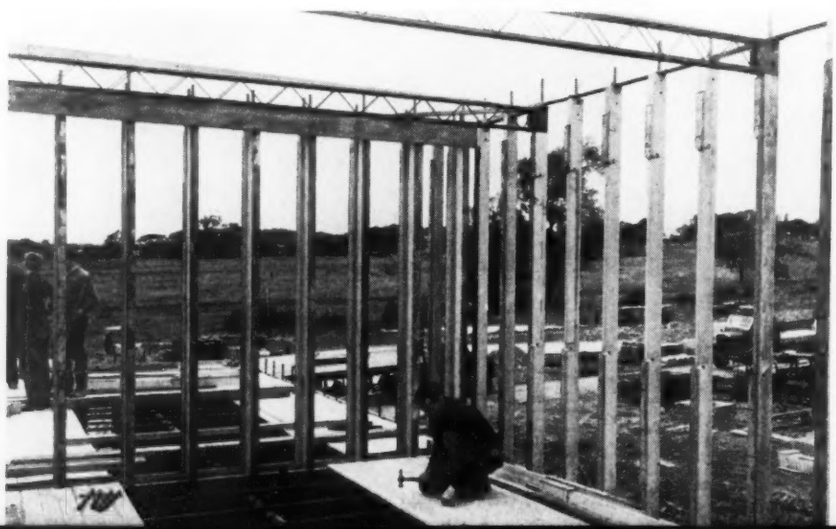
The hall, with adequate space for a baby carriage, leads to a small sitting room and a kitchen-living room. A small scullery contains larder, cupboard, sink, etc. Directly above it is the bathroom. Each of the three bedrooms on the second floor contains a built-in clothes closet.

The precast units weigh about 36 lb. each and can thus be easily handled. Wall slabs are secured to the concrete posts by copper ties, the vertical butt joint being backed with a bituminous composition. The slabs, 3 ft. long, 9 in. wide, approximately 1 in. thick, are laid in courses, dry, being tapered in section and having dry overlapping horizontal joints.

Windows are metal, in timber frames. The vertical uprights of the house frame continue through window openings, for which they provide the mullions, thus rendering load bearing window heads or sills unnecessary.

The internal walls are of aluminum insulating sheet, fastened

CONCRETE POSTS (below) are set to receive precast wall slabs for second story of house. Also in place are lattice steel joists for floor and roof.



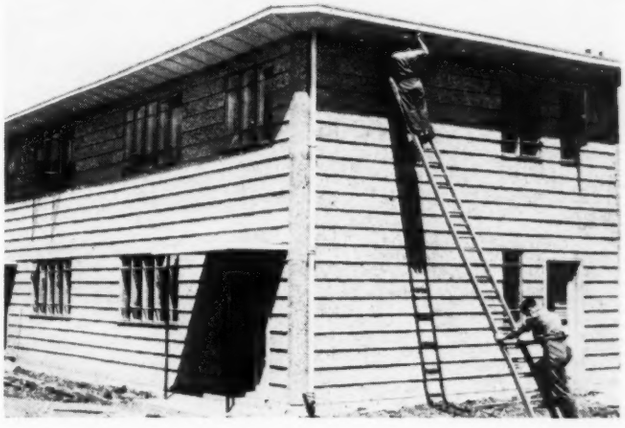
to the uprights. Insulating board is used for the finished internal lining.

The uprights of the upper story are connected to the corresponding posts below by projecting metal dowels which fit inside each post. The uprights are also bolted to the first floor joists and roof members, thus tying the whole structure together. These joists are of light-gage lattice steel, with timber nailing strips for ceiling and floor.

The total weight of the precast concrete superstructure for a pair of Airey houses is approximately 28 tons.

PARTIALLY COMPLETED WALL shows precast slabs fastened to concrete posts by copper wire ties. Wallboard lining is later attached to wood nailing strips in concrete posts and intervening space filled with insulating material.

PITCHED ROOF TYPE of two-family house is here completed, showing walls of precast concrete slabs 3 ft. long and 9 in. wide, each weighing not more than 36 lb.



FLAT-ROOFED TYPE of Airey house on London County Council estate at Chingford, Essex, has projecting eaves on which workmen are putting finishing touches.

DRAGLINE CONVERTED TO SLACKLINE CABLEWAY

By **ROBERT R. KEELER**

Ridgefield, Conn.

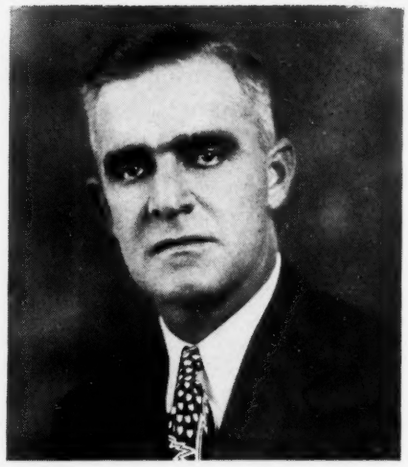
TO MOVE several hundred yards of excavation from a spot inaccessible to hauling equipment because of boggy ground, Raymond M. Keeler of Keeler Contracting Co., Ridgefield, Conn., rigged up a small Unit crawler crane as the headtower of a slackline cableway with a span of 250 ft. Extra lengths of cable were added to the load and holding lines of the rig, reeved through a tail sheave fastened 6 ft. above ground to a large tree, and hooked up to a Sauerman Crescent bottomless bucket. The backline was run through the rig's boom sheave, the pull line through the fairleads.

Most of the excavating was done by a Lorain dragline worked into the area near the tail block. This machine cast the spoil under the cableway, from where it was dragged forward by the cableway to within reach of a bulldozer for final disposal.

Present and Accounted For...A PAGE OF PERSONALITIES

WISCONSIN BUILDERS ASSOCIATION, newly organized group, is headed by SYDNEY DWYER, of Sid Dwyer & Associates, Inc., Milwaukee building, developing and real estate company.

NEW VICE-PRESIDENT of Southeastern Construction Co., of Charlotte, N. C., is HARRY W. LOVING, former vice-president of J. A. Jones Construction Co., of Charlotte. For several years he served as executive secretary of Carolinas Branch, Associated General Constructors. During War he was with Chief of Engineers, U. S. Army, on contract and renegotiation boards.



ELECTED PRESIDENT of Alabama Road Builders Association is J. P. MOSS, president and general manager of Moss-Thornton Co., Inc., general contractors, of Birmingham.

INSIDE VINCENTE TUNNEL on San Diego, Calif., Aqueduct are (left to right): R. B. DIEMER, chief operation and maintenance engineer, Metropolitan Water District; COMDR. ROBERT D. THORSON, resident officer for Navy; ROBERT BURNETT, U. S. Bureau of Reclamation engineer; CHARLES CLAPP, general superintendent for contractor; LIEUT. COMDR. F. M. HINES, in charge of northern and central sections; and J. L. BURKHOLDER, general manager and chief engineer, San Diego County Water Authority.

NAMED PRESIDENT of American Railway Engineering Association is ARMSTRONG CHINN, president of Terminal Railroad Association of St. Louis, Mo.

←

EXAMINING TABLE-SIZE MODEL of Mississippi River drainage system at U. S. Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss., are (left to right): COL. CLARK KITTRELL, division engineer, Upper Mississippi Valley Division, St. Louis, Mo.; MAJ. GEN. ROBERT W. CRAWFORD, president, Mississippi River Commission, Vicksburg, and chairman of board; BRIG. GEN. LEWIS A. PICK, division engineer, Missouri River Division, Omaha, Neb.; COL. HENRY HUTCHINGS, JR., division engineer, Southwestern Division, Dallas, Tex.; and GAIL A. HATHAWAY, of the Office of Chief of Engineers, Washington, D. C.

Measure your wire rope costs in terms of time saved through elimination of delay and you will find that it costs no more to use the best—in fact it is saving money on many jobs. Our engineers will be glad to make a survey for you and make recommendations that will give you greater efficiency from your equipment. Write for information.

J&L STEEL

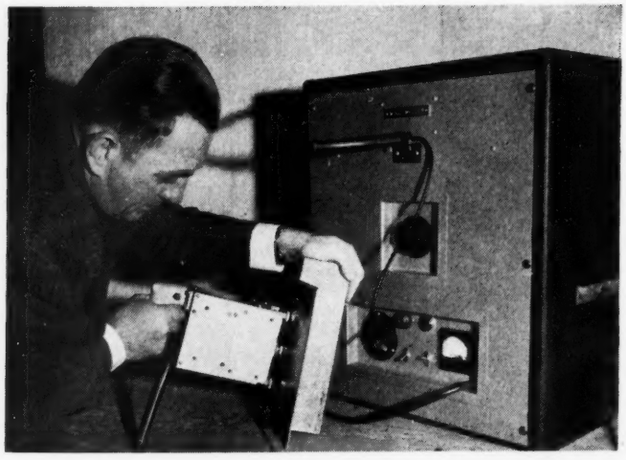
JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

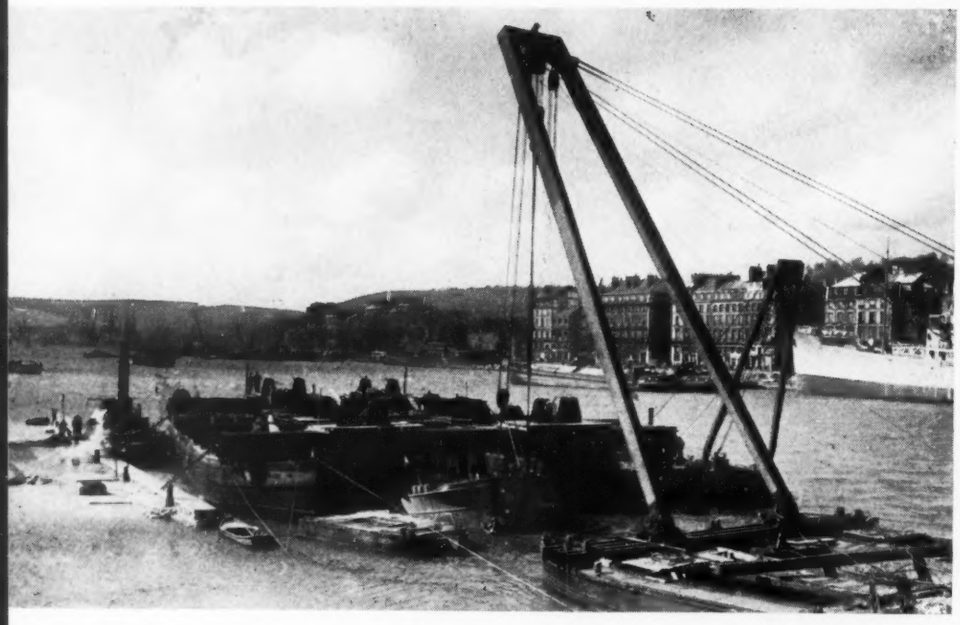
PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

JOB oddities



WOOD WELDING may be next development in construction procedure, for JACK B. CUNNINGHAM, Burbank, Calif., has devised a 1-kw. shortwave welding machine that instantaneously spot-welds wood members with synthetic glue. Current application by hand gun sets up molecular frictional heat in both wood and glue, causing glue to harden in few seconds. Inventor is shown here tacking 1/4-in. wall panel to 2x4-in. studding. Wide World Photo

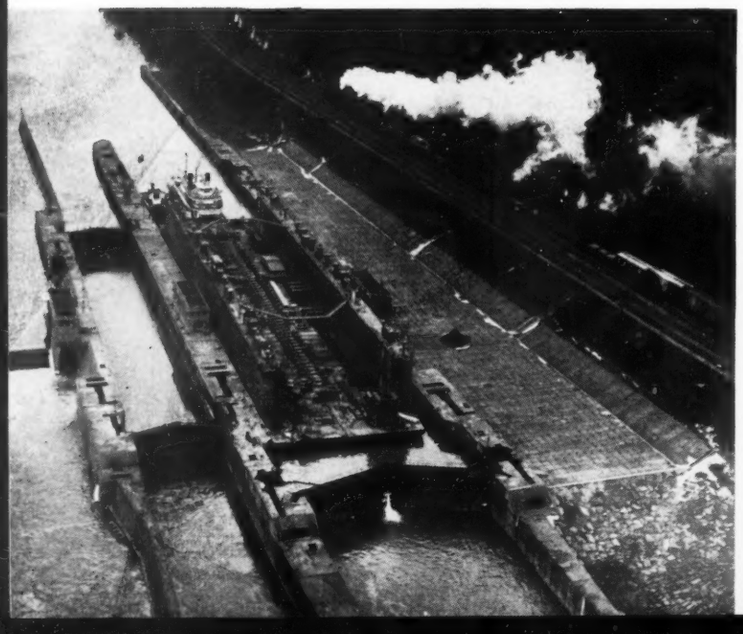


← WINCHES on girders spanning between two barges and assisted by floating derrick lift sunken ship from Rouen Harbor on Seine River. Clearing sunken hulks from French harbor still continues three years after Germans were forced out of France. Wide World Photo

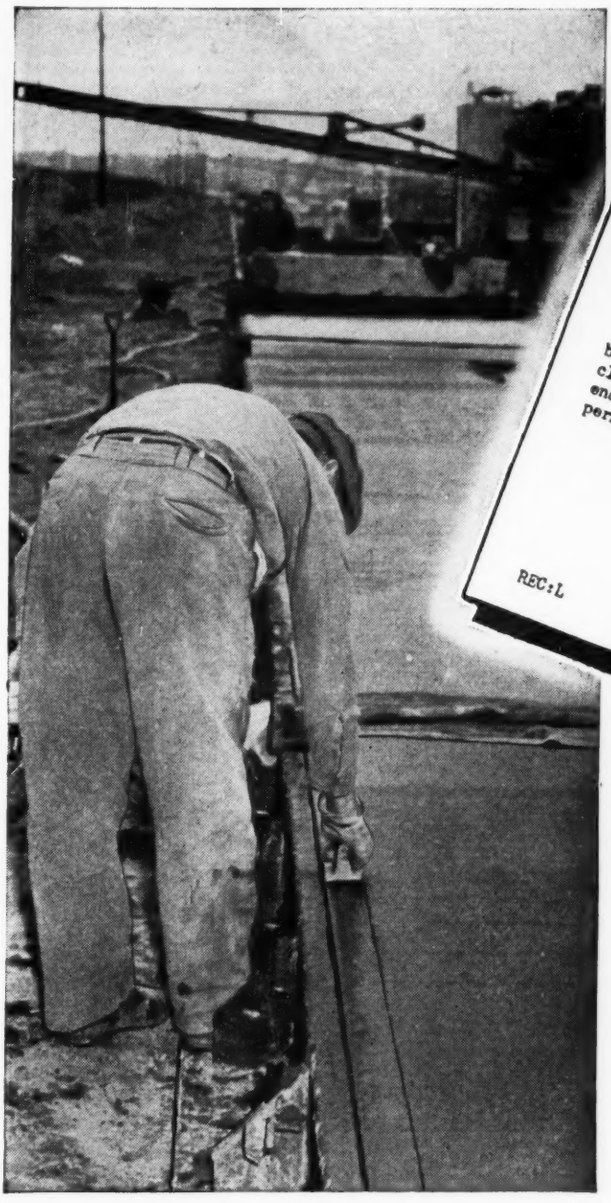
IT'S A TIGHT SQUEEZE for Navy's floating drydock, AFDL-47 (below), largest vessel ever launched on inland river. En route from Pittsburgh, where it was launched at Dravo Corp.'s Neville Island shipyard, it has 6½-ft. clearance on either side as it passes through Dashields Locks in Ohio River below Sewickley, Pa. Vessel is 448 ft. long, 97 ft. wide and 45 ft. high.

HAND EXCAVATION (below) in hot desert sun seems to be preferred method of trenching for new 16-in. oil pipeline being built across Iraq by international combine, Iraq Petroleum. Natives dig ditches, supervised by their own countrymen, English and French welders assemble pipe, while project, proceeding at rate of 1½ mi. per day, is directed by American pipeline experts.

Press Association Photo



"another successful experience ...with Atlas Duraplastic"



ROBERT W. CLEVELAND & CO.
Contractors
East Orange, New Jersey

December 13, 1946

Universal Atlas Cement Company
Chrysler Bldg.,
New York 17, N.Y.

Gentlemen:

Completion of our paving contracts on New Jersey Route 25 marks another successful experience for us with Atlas Duraplastic air-entraining cement.

As usual, we found that the mix was very workable and cohesive and did not segregate.

Again we found the amount of bleeding to be negligible. This advantage enabled our finishers to follow closely behind the mixer. Thus, long waits and overtime at the end of the day were reduced and early protection for curing was permitted.

Very truly yours,

ROBERT W. CLEVELAND & CO.

Loyal E. Cleveland

Loyal E. Cleveland
Partner

REC:L

Making better concrete with Duraplastic cement is simple . . . no added materials . . . no unusual changes in procedure. The mix is more cohesive and more plastic. It flattens out without segregation . . . bleeding is minimized.

At no extra cost, Duraplastic provides the proper amount of entrained air by intergrinding with the cement the precise amount of air-entraining material needed for satisfactory field performance.

Send for further information. Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

CM-D-19

OFFICES: Albany, Birmingham, Boston, Chicago, Cleveland, Dayton, Des Moines, Duluth, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.

AIR BUBBLES IN CONCRETE MAKE IT MORE DURABLE AND MORE PLASTIC

ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

AIR-ENTRAINING PORTLAND CEMENT

MAKES BETTER CONCRETE AT NO EXTRA COST

"THE THEATRE GUILD ON THE AIR"—*Sponsored by U. S. Steel—Sunday Evenings—ABC Network*

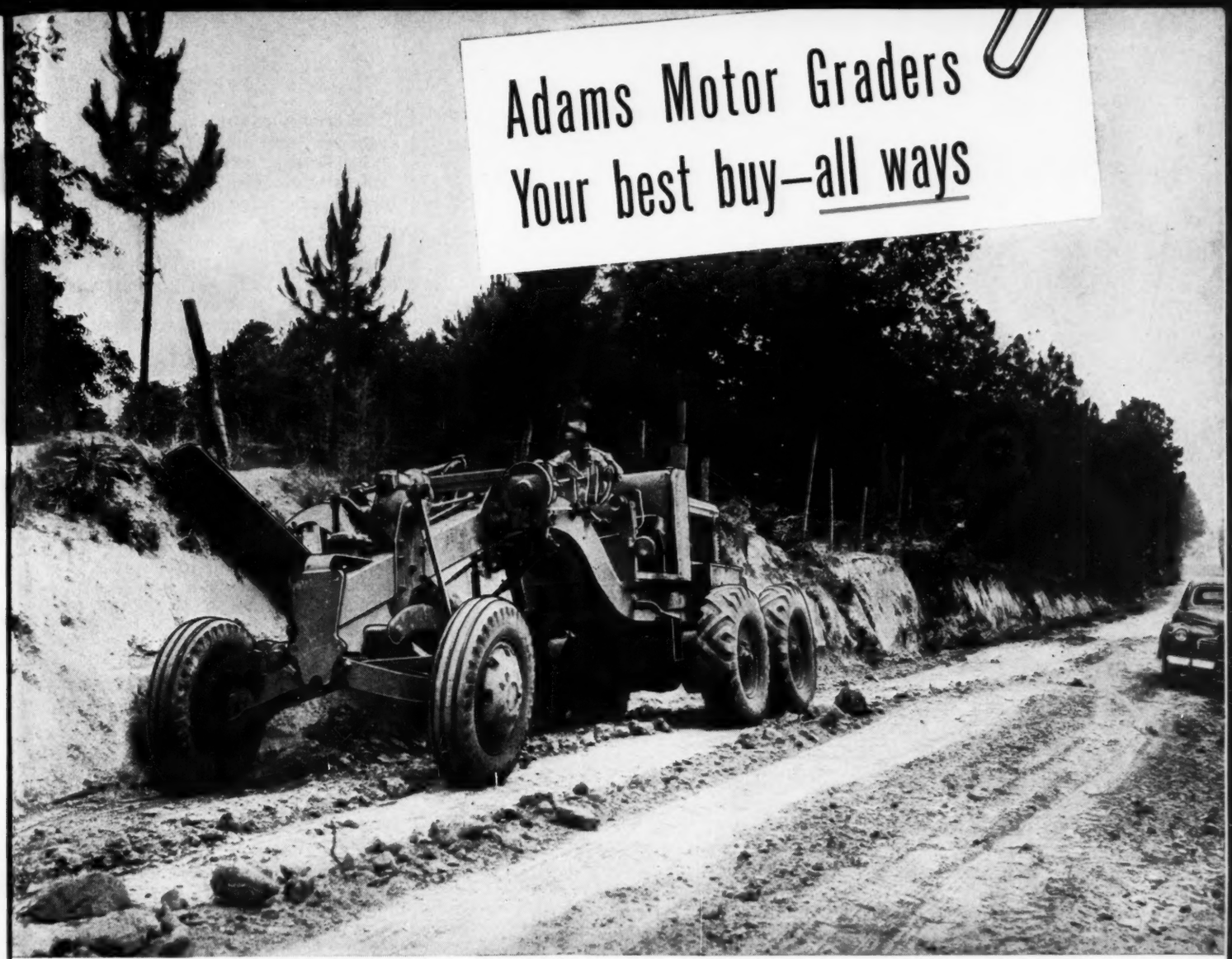
CONSTRUCTION EQUIPMENT NEWS

JUNE 1947 REVIEW of Construction Machinery and Materials

TRACTOR CRANE-DRAGLINE — Hyster has developed a versatile combination crane, clamshell and dragline unit for attaching to rear end of Caterpillar D6 or D7 tractors. For the D6 the rig has a 25-ft. boom with safe load capacity of 6,100 lb., handles a ⅜-yd. dragline bucket, ¼-yd. digging clamshell or ½-yd. rehandling clamshell. The D7 model has a 30-ft. boom with capacity of 6,600 lb., takes a 1½-yd. dragline bucket and ⅜-yd. and ½-yd. digging and rehandling clamshells. Intermediate 5-ft. and 10-ft. sections of the bolted boom are available. The boom is live and swings 240 deg. at 4.5 r.p.m. at 45-deg. angle; the D6 boom can dump a dragline bucket at a height of 16 ft., the D7 at 18 ft. Power is taken from the tractor through a permanently installed transmission. Two hoist drums, boom hoist and swing gear drive off the transmission through a gear train. Mounted on the tractor rear end, the rig doesn't interfere with bulldozer attachment or operation but for sustained bulldozing the crane attachment can be removed in the field without additional equipment, and can be easily replaced in 2 hr. The three hoist lines lead through the swing pivot point to sheaves on the backstay A-frame. **—Hyster Co., Portland 8, Ore.**

CONVEYOR BELT—New conveyor belt 250 to 400 percent stronger than previous rubber-fabric belts has been developed for conveying coal,

(Continued on page 98)



Ditch Cuts to Bank Cuts

IN JUST 45 SECONDS

● Yes, 45 seconds does it with an Adams Motor Grader. Using only Adams power-operated cab controls, you shift from deep ditch cuts to high bank cuts (or vice versa) in just 45 seconds—*with blade centered on circle—without changing "average" setting of telescopic blade lift links.*

This important Adams advantage means that the operator obtains virtually any desired blade position right from the cab—*without leaving his seat—without stopping the grader.* The result is faster work—more accurate and satisfactory work . . . *at lower cost.*

This is but one of the superior operating advantages built into Adams Motor Graders. Your local Adams dealer will gladly show you how and why Adams Motor Graders are *Your Best Buy—All Ways.*

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, INDIANA

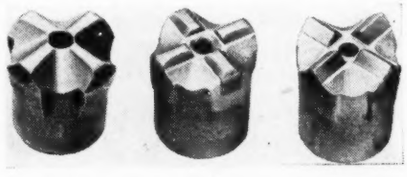
Adams

MOTOR GRADERS • LEANING WHEEL GRADERS • ELEVATING GRADERS

(*Continued from page* 96)

aggregate, iron ore, and other bulky materials over long distances. It is especially designed for use in mines, quarries and large dam construction projects. Key to its increased strength is revolutionary new textile construction of nylon and Ustex yarn that increases permissible working tension of each ply two and one-half times and permits use of more plies. It will carry heavier loads than other rubber-fabric belts and extend range of conveyors. It will eliminate, many costly transfer points and extra driving mechanisms. New belt also has advantages of low stretch lengthwise and increased flexibility crosswise, which make it possible to build longer and heavier belt with minimum of stretch and excellent troughing qualities. It can be spliced easily and quickly.—**United States Rubber Co., Rockefeller Center, New York, N. Y.**

REVOLUTIONARY DRILL BIT — Small bore rock drilling may be revolutionized by new type drill bit with phenomenally long life and gage-keeping qualities being readied for mass production by Ingersoll-Rand. Bit has inserts of Carboloy tungsten carbide, and tests in granite indicate drill runs of up to 250 ft. before dulling vs. 2 to 3 ft. with steel bits. In other tests, where ordinary bits drilled only 12 to 14



CEMENTED CARBIDE JACKBIT (center) shows no more wear after drilling 250 ft. than does steel bit (left) after run of only 2 ft. in same rock. At right is unused bit with Carboloy inserts.

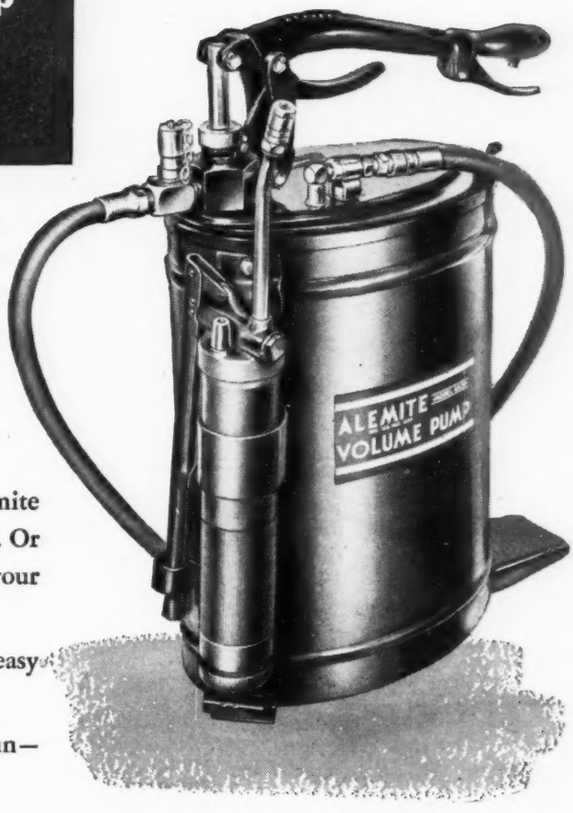
ft. per min., Carboloy-set Jackbits made 25 to 30 ft. per min. with resultant 33 to 50-percent saving in air consumption. New type bit holds gage for entire length of average hole. Tapered holes are eliminated and less actual rock must be drilled out, as starting diameter is same as final required for placing charge. Only limit to continuous drilling is available length of drill feed. Carboloy-set Jackbits are interchangeable with Ingersoll-Rand's new line of standard steel stud Jackbits and may be used with drifters, stopers or jackhammers.—**Carboloy Co., Inc., Detroit, Mich.**

TRACTOR EXCAVATOR—T6 Traxcavator is mounted on and engineered as unit with Caterpillar D6 tractor to make fullest use of its

(*Continued on page* 100)

Never Before so Much Lubrication Help in One Small Package

New Combination Volume Pump and Grease Gun Loader by Alemite

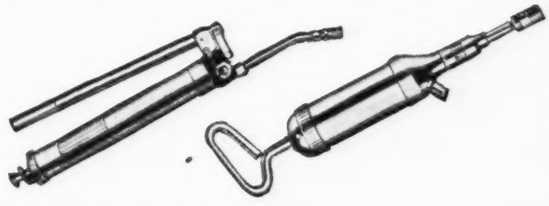


- It's a portable double-action volume pump that delivers grease to bearings through 5½ ft. of hose and hydraulic coupler at 3000 lbs. pressure. Every drop of lubricant protected from contamination.
- *And*—it's a clean, easy, safe loader for grease guns.
- It's available in a single unit as illustrated with genuine Alemite push-type or lever-type hand gun and hand gun carrying bracket. Or—you can order it without the gun and bracket and convert your present Alemite guns to fit loader equipment.
- The full, open head cover on the 35-lb. capacity tank makes it easy to carry and easy to fill. What's more...
- Two men can grease at the same time—one using the hand gun—the other with the volume pump.

How You Load Grease Guns Full ... Without Mess or Waste

1. The hand gun has a special loader fitting. To fill the gun, simply insert the fitting into the loader valve on the pump. Then pump until the gun is full. No air pockets—a full gun every time.

2. You'll know when the gun is full. The loader valve automatically closes. The pump handle locks and you can't possibly overload the gun or damage the gun barrel. *And* there's no grease to wipe off the gun.



New Alemite Hand Guns with Loader Fitting

Lever-Type Gun . . . a heavy duty gun with loader fitting mounted in the head. Gun is available in two models—No. 6679-E and No. 6243-E.

Push-Type Gun—the loader fitting mounted in the head. Available in two models—No. 7553 and No. 7584.

Cutaway View of Alemite Loader Valve

Model G-306740. This is the same valve as shown on the guns. It's available for you to convert present Alemite guns to loader operation with the new Alemite Combination Volume Pump and Grease Gun Loader.

Consult the nearest Alemite Distributor for complete details, or write to Alemite, 1840 Diversey Parkway, Chicago 14, Ill.

ALEMITE
REG. U.S. PAT. OFF.

Alemite ALONE Combines all 3 in Lubrication

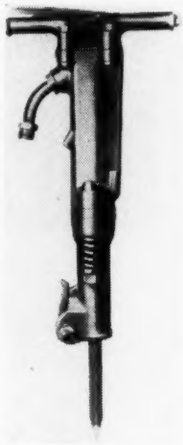
1. EQUIPMENT 2. PROCEDURES 3. LUBRICANTS

Another Product of STEWART WARNER

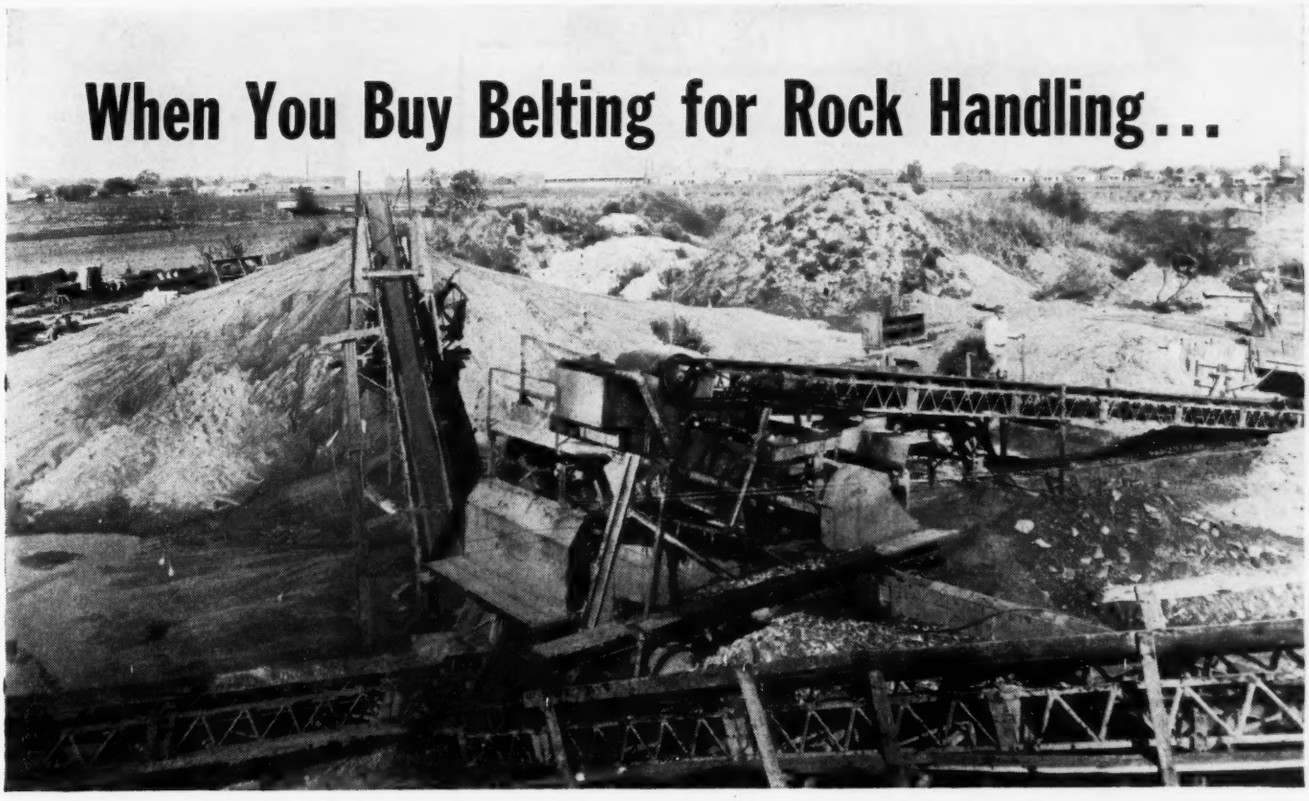
(*Continued from page 98*)

power and work capacity. Buckets of 1½ or 1¾-cu. yd. rated capacity are standard with new T6. Quarry, heavy duty and other buckets for special uses can also be supplied. Buldozer blade, quickly interchangeable with bucket, is also available. **—Trackson Co., Milwaukee 1, Wis.**

PAVING BREAKER— New 82-lb. machine is suitable for heavy-duty demolition work and general paving breaking jobs. New kicker-port valve used in PB-8 increases efficiency and striking power of machine. Metering device furnishes proper lubrication for all working parts. Adequate oil reserve is provided by a generous size oil reservoir in the handle. Rigid joint between handle and cylinder is result of four-bolt construction. **—Ingersoll-Rand, 11 Broadway, New York 4, N. Y.**



When You Buy Belting for Rock Handling...



Protect the Investment With Thermoid Quality

Your Thermoid Distributor can give you delivery dates— on the type of Thermoid Conveyor or Elevator Belting you need.

When rock products ride belt conveyors, the belting takes such a beating as to make belt quality a vital dollar and cents consideration. That's why replacement of belting is an important item in every year's operating expense. Thermoid recognizes these severe wear conditions and includes in its line belting of exceptional toughness that pays off in terms of maximum tonnage per belt-dollar.

When the Thermoid Trade Mark is on such belting, everyone, from top management down, knows that the Purchasing Agent is buying the best that can be had.

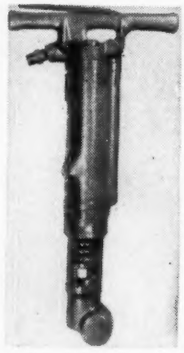
The men responsible for maintaining equipment of this type will be glad to know that through increased production, deliveries of Thermoid Conveyor and Elevator Belting are again predictable and that Thermoid products, carefully made of the toughest materials by skilled craftsmen can now be ordered for replacements long overdue.

It's Good Business To Do Business With Thermoid!

Thermoid
INDUSTRIAL RUBBER PRODUCTS
BUILT FOR THE JOB
QUALITY VALUE SERVICE

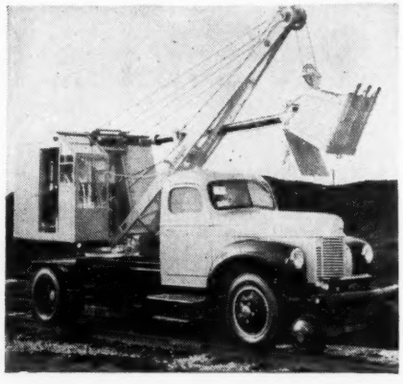
Thermoid Products
AUTOMOTIVE • INDUSTRIAL
OIL FIELD • TEXTILE
THERMOID COMPANY, TRENTON, N. J., U. S. A.

THE THERMOID LINE
Includes: Industrial Brake Linings and Friction Products • Transmission Belting • Light Duty and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose



PAVING BREAKER—Schramm B-80 paving breaker with its unique, compact mechanism is economical, easy running, hard-hitting tool. It is fully air-cushioned and improved in materials and details of design. It is provided with an ample oil chamber to aid in proper lubrication of parts. High-grade special analysis drop forgings are used, carefully machined, heat treated and accurately ground to give this breaker greatest endurance and reliability.—**Schramm, Inc., West Chester, Pa.**

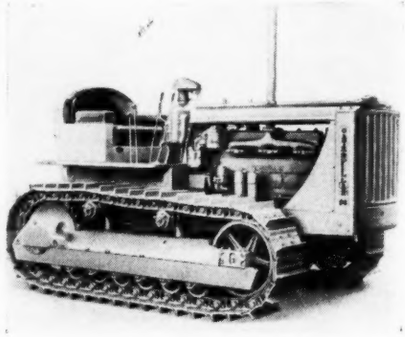
AUTO RAILER—Evans Auto-Railer, with Quick Way ¼-cu. yd. truck shovel mounted on International 147-in. wheelbase Model KB-5 chassis, is dual-purpose vehicle designed for operation on railroad tracks and highways. Full revolving truck



shovel can be converted to crane or trench hoe and is powered by International Harvester 4-cylinder engine. Auto-Railer can be run over highway to railroad crossing nearest point of work and then run on track.—**Motor Truck Division, International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.**

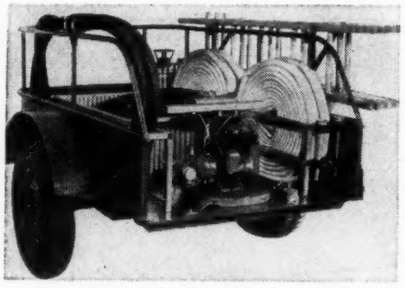
COMPRESSORS—Unitair compressors are available in nine sizes with power requirements ranging from 15 to 100 hp. and piston displacements from 81 to 590 cu. ft. per min. at 100 lb. discharge pressure psi. based on 60-cycle motor speeds. Because of compact construction and smooth, vibration-free operation, Unitair requires but small foundation. It is completely air-cooled. Three standard electric drives include built-in motor, direct-connected motor and V-belt drive. Use with gasoline or diesel engines is also possible. — **Sullivan Division, Joy Manufacturing Co., Oliver Bldg., Pittsburgh 22, Pa.**

GRADERS AND TRACTORS — Greater working capacity and longer life are said to be assured by the manufacture of two Caterpillar diesel motor graders and two truck-type tractors now in production. Built around two new diesel engines, the 4-cylinder D315 and the 6-cylinder D318, the No. 12 motor grader at 100-hp. is said to make it possible to work at rates not hitherto approached by this type of unit and the No. 112 at 70-hp. is qualified to perform jobs hitherto reserved for only the largest size grader. Features of these graders: (1) 100 percent constant-mesh transmission, with helical gears eliminates necessity of stopping to change speeds; (2) six forward speeds, one for every type of job; (3) power-operated mechanical controls equipped with effective brakes; (4) arched front axles for maximum clearance. Two new tractors also are built for higher average working speeds, accomplishment of



more work and greater earning capacity. The D4 and D6 will develop 43 and 65 drawbar horsepower respectively, increasing pull which means bulldozer loads moved at higher speeds and faster scraper hauling to move more dirt at end of day. — **Caterpillar Tractor Co., Peoria, Ill.**

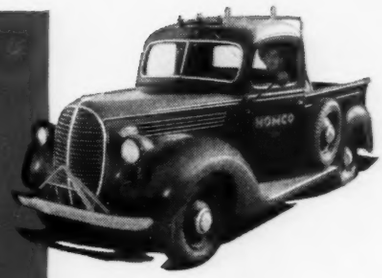
PORTABLE FIRE FIGHTER—Compactly mounted on sturdy two-wheeled trailer, Porto-Pumper consists basically of Porto-Pump, gasoline-driven high-pressure utility



pump; 75 ft. of supply hose and 250 ft. of fire hose; 18 ft. 3-section extension ladder; fire axe and hand type extinguisher. It can be easily attached to automobile, jeep, or truck.—**Porto Pump, Inc., 227 Iron St., Detroit, Mich.**

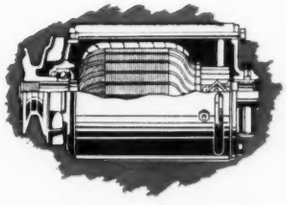
"Certainly FORD TRUCKS LAST LONGER!"

"That's why we operate 207 of them!"—says C. R. Littlepage, Supt. of Transportation, Houston Oil Field Material Co., Houston, Texas.



Two 1939 Ford Trucks owned by HOMCO that prove the point: (Above) Driver Joe Zachary and Pickup, mileage 207,316; (Below) Driver H. O. Carpenter and Pickup, mileage 228,398. Supt. Littlepage adds: "Our Ford Trucks deliver trouble-free miles at minimum cost!"

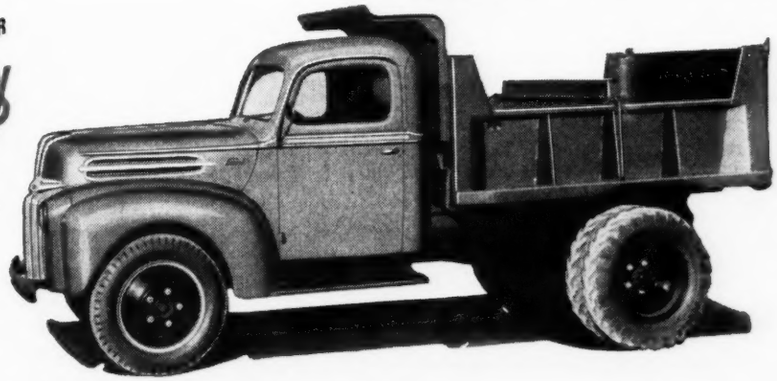
One BIG Reason—
FORD ELECTRICAL UNITS STAND UP!



The fame of Ford Trucks for swift, sure starting and all-weather reliability rests solidly on Ford design and Ford quality . . . in particular, the Ford Electrical System. More than 12 million Ford-designed starter motors and generators have been built in Ford shops. Repeated tests for electrical efficiency consistently prove these fine, Ford-built units to be outstanding. Long, trouble-free generator service is assured by such long-life features as pre-lubricated, sealed ball bearings on armature shafts, and by bushings wick-lubricated from a reservoir with an overflow drain, which prevents surplus oil from reaching commutator. Ford starter motors are pre-lubricated, requiring no oiling whatever. Ford wiring and generous battery and generator capacity adhere strictly to the highest standards of the industry. The simplicity and high efficiency of the Ford starting system circuit, too, have much to do with Ford's faithful starting performance.

Ford

THE 6 YOUR PICK OF POWER THE V8

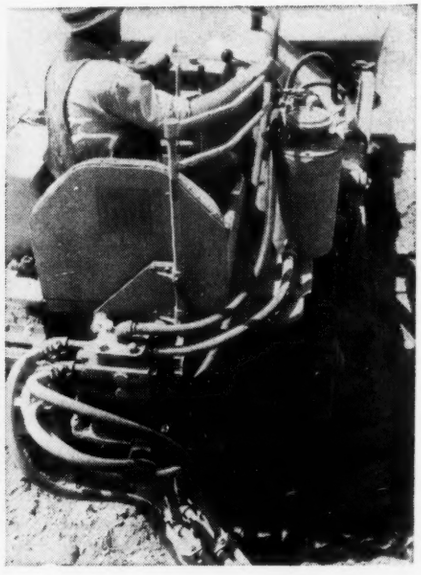


Hauling bulk building and street construction materials, the Ford Dump Truck chassis provides capacity, maneuverability and long life that have made it a prime favorite everywhere. This shows an 8-foot-long center-gate Dump body for "batch-work," by Anthony Company, Streator, Illinois.

Only Ford Brings You All These Long-Life Features: Your choice of engines, V-8 or SIX —each with new Flightlight oil-saving 4-ring pistons and precision bearings · true truck frames in all models, with siderails *doubled* in heavy duty units · rear axle shafts free of weight-load, ¾-floating in half-ton units, full-floating in all others · big, easy-action brakes with non-warping, score-resistant cast drum surfaces—in all, *more than fifty* such endurance engineering features! And more than 100 body-chassis combinations to choose from. See your Ford Dealer now!

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE!

HYDRAULIC TRACTOR UNITS—Low-cost hydraulic conversion packages hook into existing hydraulic systems, making it possible to operate 2- or 4-yd. scraper in combination with present dozers without having to purchase additional



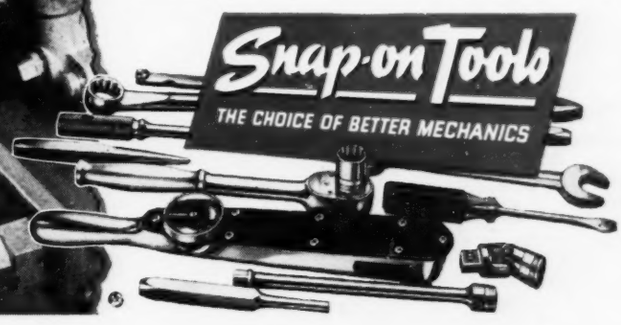
hydraulic system for scraper operation. Conversion units are available in two designs—one for adapting

(*Continued on page* 110)

adjusting bolts on air compressor with a Snap-on Blue-Point Boxocket

Here is a typical application that demonstrates the importance of a Blue-Point Boxocket. Working space does not permit use of a socket wrench . . . sharp, projecting parts demand a wrench that provides knuckle clearance . . . the nut is large requiring ample leverage. This is a job that's a "natural" for a Blue-Point Boxocket. It slips on easily . . . completely encircling the nut and gripping firmly on all corners. Note how the offset handle gives ample clearance and avoids skinned knuckles . . . how the long handle length provides powerful leverage. These are features that add speed and safety to your jobs. Complete range of sizes. Direct factory branches are located in 39 principal cities to provide Snap-on's complete tool service to all important industrial areas.

SNAP-ON TOOLS CORPORATION
8084-F 28th AVENUE • KENOSHA, WISCONSIN
International Division: Kenosha, Wisconsin, U. S. A.



"That new Rex Tilter sure is a money-maker!"

You'll mix more yards per day . . . concrete or mortar . . . make more profit per job with a new Rex Tilting Mixer. It's the greatest money-maker you've ever seen.

Note these time-saving, job-speeding features. Perfect balance with low center of gravity and 62-inch wheel spread for fast, safe towing. Easy rolling pneumatic-tired wheels mounted with Timken bearings plus accurate balance make it easy for one man to spot the mixer. Four-point suspension assures stability while mixing . . . no "teetering" or shifting. Two-position loading . . . you can bring the barrow straight to the drum, head-on or sideways without interference. Fast, thorough mixing action and convenient controls. Long-lasting, all-welded, pressed steel drum bowl. Dependable, economical power plant. Complete lubrication from the outside.

Add them up, you'll see why you get more of everything . . . service, long life, dependability and profit . . . with the new Rex 3½S Tilting Mixer. It conforms with A.G.C. Standards—for your protection.

See them at your local Rex Distributor or write Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wisconsin, for all the facts.

CHAIN BELT COMPANY *of* MILWAUKEE

REX

CONSTRUCTION MACHINERY


PUMPS


PAVERS


PUMPCRETES

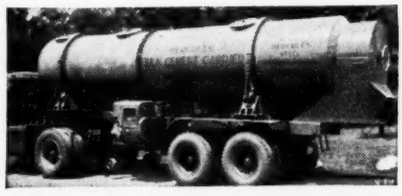

MOTO-MIXERS


MIXERS

(*Continued from page* 106)

new 2-cu. yd. LaPlant-Choate scraper to present D-2 hydraulic dozers and the other for adapting 4-cu. yd. scraper model to D-4 dozer units.—**LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.**

CEMENT CARRIER—A new bulk cement carrier, Model 100-B, transports a load from 100 to 110 bbl. of dry cement and is powered to discharge the full load in 4 min. It is particularly designed to haul dry bulk cement from mill to warehouse and from warehouse to the job or individual contractor. The body of the new cement carrier has three manhole filler openings. Each with

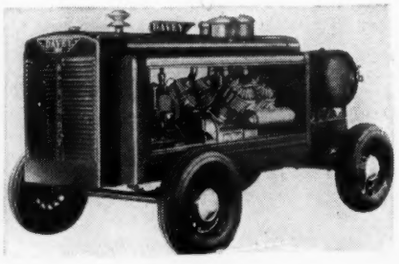


a hinged cover with manual locking device and fitted with a tubular rubber gasket. Discharge door at the rear end of the body is equipped with a circular door, with rubber gasket. Door operation is by a threaded shaft, turned by a large handwheel, thus controlling rate of discharge. The discharge chute is fully inclosed. Power unit is a Wisconsin air-cooled gasoline engine of four cylinders, and the carrier is mounted on a trailer.—**Hercules Steel Products Corp., Galion, Ohio.**

SNOW REMOVAL—A hydraulic reversible plow with a moldboard shaped so that snow is picked up by the whole length of the cutting blade and moved in a helical path across it to discharge at an angle above the moldboard has been per-

fected for airport snow plowing. High cutting angle gives more sidethrust than is found in highway plows but this is overcome by powering with a Four-Wheel Drive truck that moves the plow at high speed.—**Four Wheel Drive Auto Co., Clintonville, Wis.**

PORTABLE AIR COMPRESSOR—V-type 160-cu. ft. portable air compressor, known as Model 160 Air Chief, is available in standard skid, steel wheel trailer and pneumatic-tired trailer mounting styles. Flanged wheel type units are also

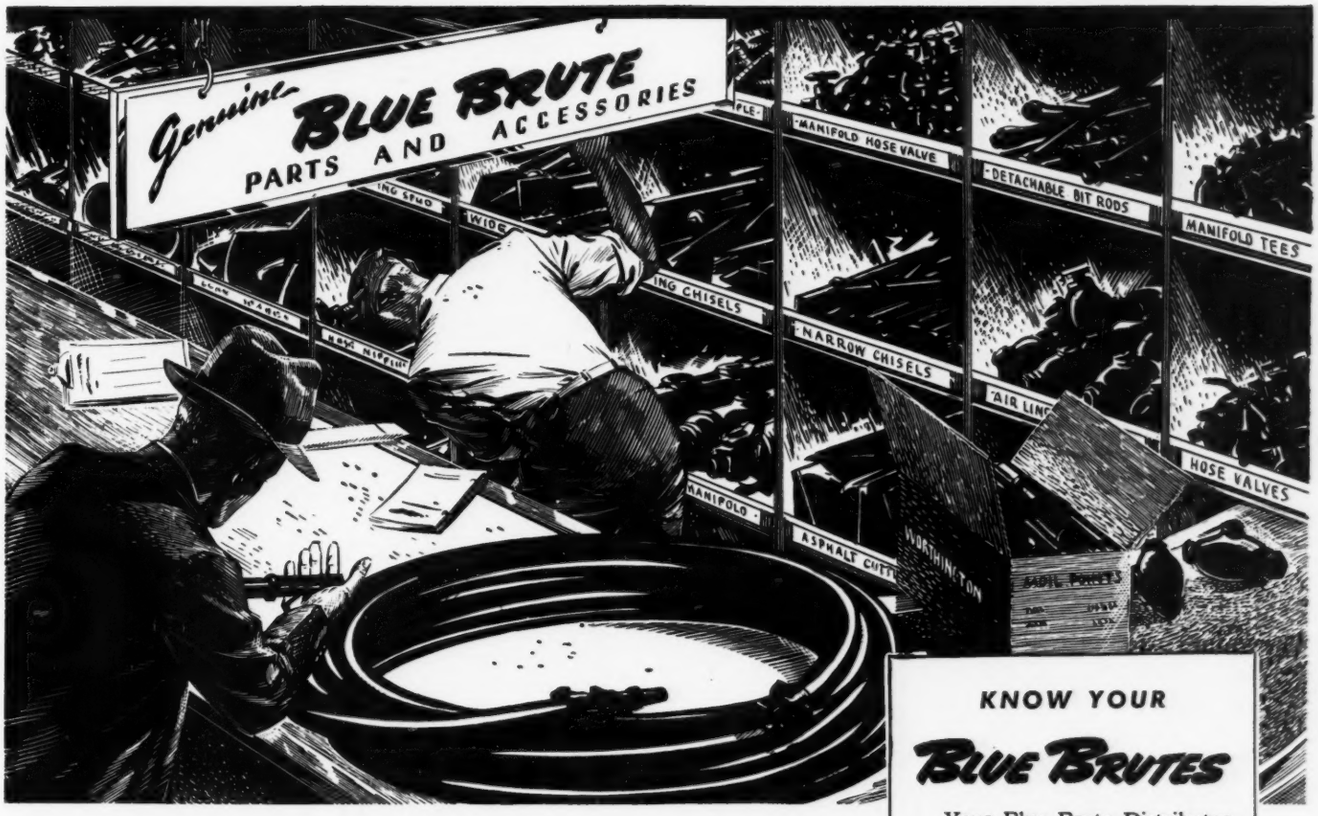


manufactured for railroad work. Unit is of double V-type design, with three low-pressure cylinders and one high-pressure cylinder. V design permits substantial reductions in dimensions and weight.—**Davey Compressor Co., Kent, Ohio.**

LOW HORSEPOWER ENGINE — Lightweight 2-hp. engine features patented easily replaceable head embodying valve mechanism and combustion chamber. Four-cycle valve-in-head engine is so constructed that almost all necessary repair work can

(*Continued on page* 117)

JUST AS TOUGH AS THEIR BIG BROTHERS



You'll find Worthington Accessories as worthy of the Blue Brute name as the Rock Drills, Air Tools, Compressors and other "big shots" in this famous line. Air Hose, Paving Breaker Moil Points and Chisel Bits — Rock Drill Steel and Bits — Line Oilers, Valves, Couplings, etc. — all made to Blue Brute standards and thoroughly tested for the job to be done.

Save time, labor and money. Make sure you're equipped with genuine Blue Brute accessories for all mining or construction work. Rugged, hard working, always dependable, they'll quickly prove to you that *there's more worth in a Blue Brute.*

H7-8

BUY BLUE BRUTES

KNOW YOUR

BLUE BRUTES

Your Blue Brute Distributor will be glad to show you how Worthington-Ransome construction equipment will put your planning on a profitable basis. His name is listed on Page 112.

RANSOME EQUIPMENT

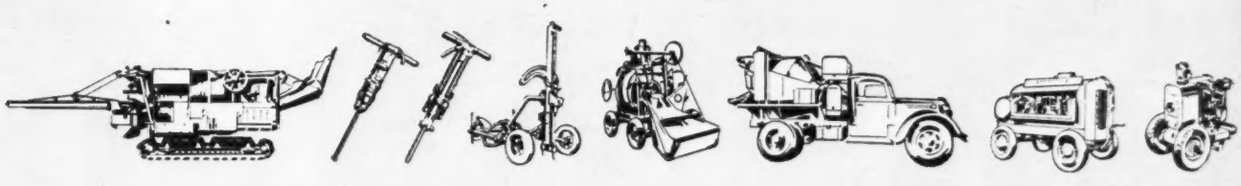
Pavers, Portable and Stationary Mixers, Truck Mixers, Pneumatic Placing and Grouting Equipment and Accessories.

WORTHINGTON EQUIPMENT

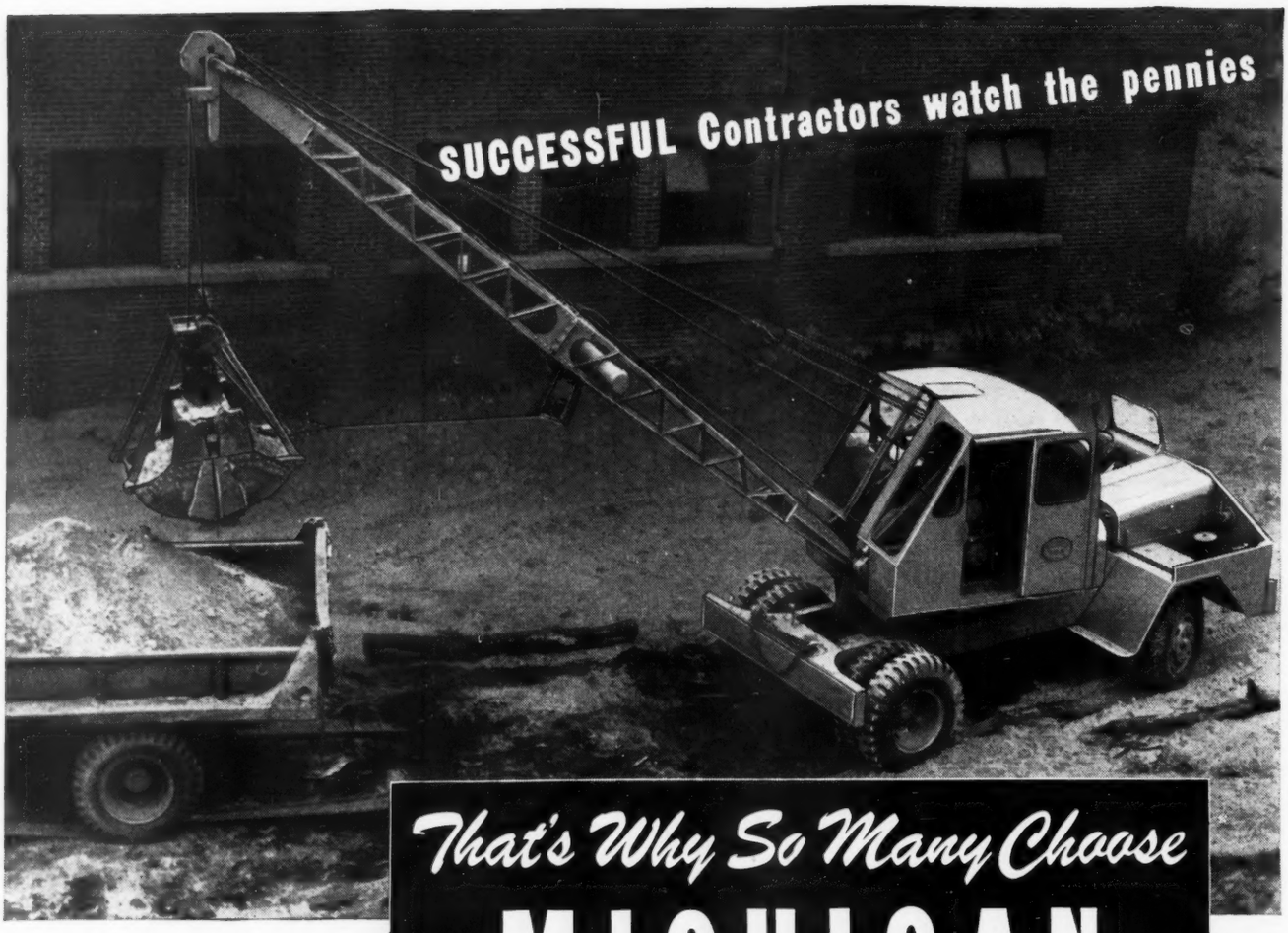
Gasoline and Diesel Driven Portable Compressors, Rock Drills, Air Tools, Self-Priming Centrifugal Pumps and Accessories.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB



That's Why So Many Choose

MICHIGAN

THE PIONEER AIR-CONTROLLED TRUCK-TYPE SHOVEL-CRANE

Noted for
OPERATING ECONOMY
•
SPEED ON THE ROAD AND ON THE JOB
•
DEPENDABILITY AND VERSATILITY

With contractors who keep a sharp eye on costs, MICHIGAN ranks "tops." They know that they can depend on MICHIGAN to deliver top-notch performance, day after day. They know that with MICHIGAN they can "come out on top" even on those small, scattered jobs that cannot be handled profitably with ordinary equipment . . . Get **all** the facts about MICHIGAN Mobile SHOVELS-CRANES—send for Bulletin CM-67.

FINGER TIP AIR CONTROLS • 6 to 12 TON CRANES • • • • 3/8 YD and 1/2 YD SHOVELS • • • • FULLY CONVERTIBLE TO ALL STANDARD ATTACHMENTS

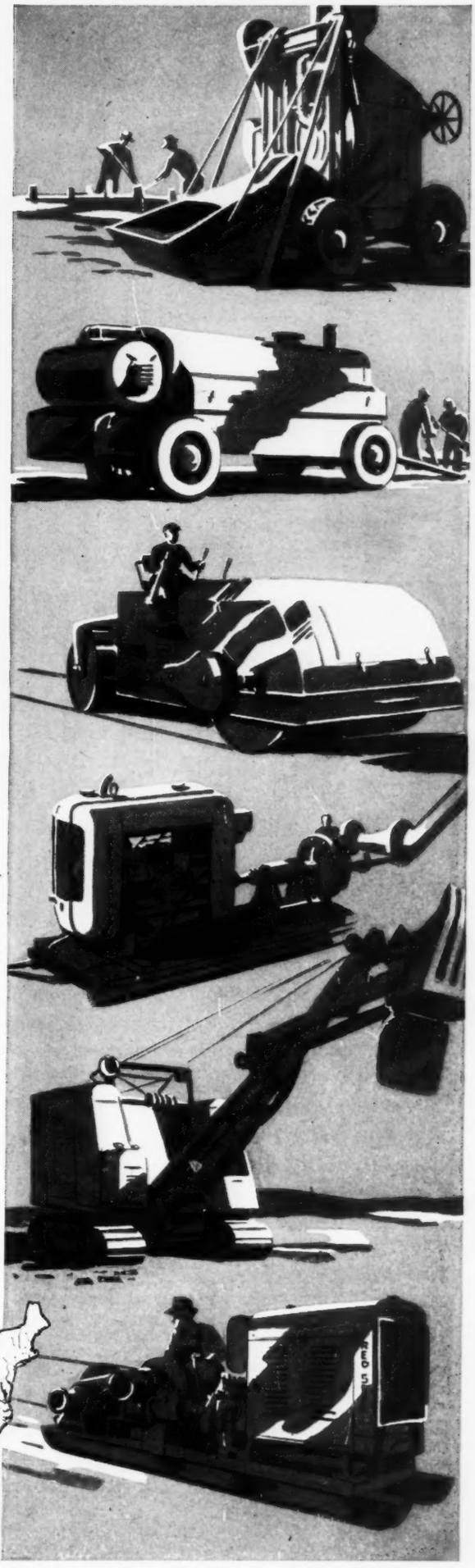
MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR MICHIGAN

There's One Best Engine for every application — the Continental Red Seal Engine Expressly designed for the job

At any given horsepower in Continental's broad range, there are up to 20 engines from which to choose. This enables you to specify the engine with exactly the characteristics demanded by the job it has to do.

The Continental Red Seal line includes both overhead and L-head engines, available for operation on gasoline, butane, fuel oil, natural gas or distillate. There are also five heavy-duty Diesels of advanced design. In this complete Continental line of specialized engines, there is one best model for your needs . . . one engine truly ***built for the job.***

Continental Motors Corporation
MUSKEGON, MICHIGAN

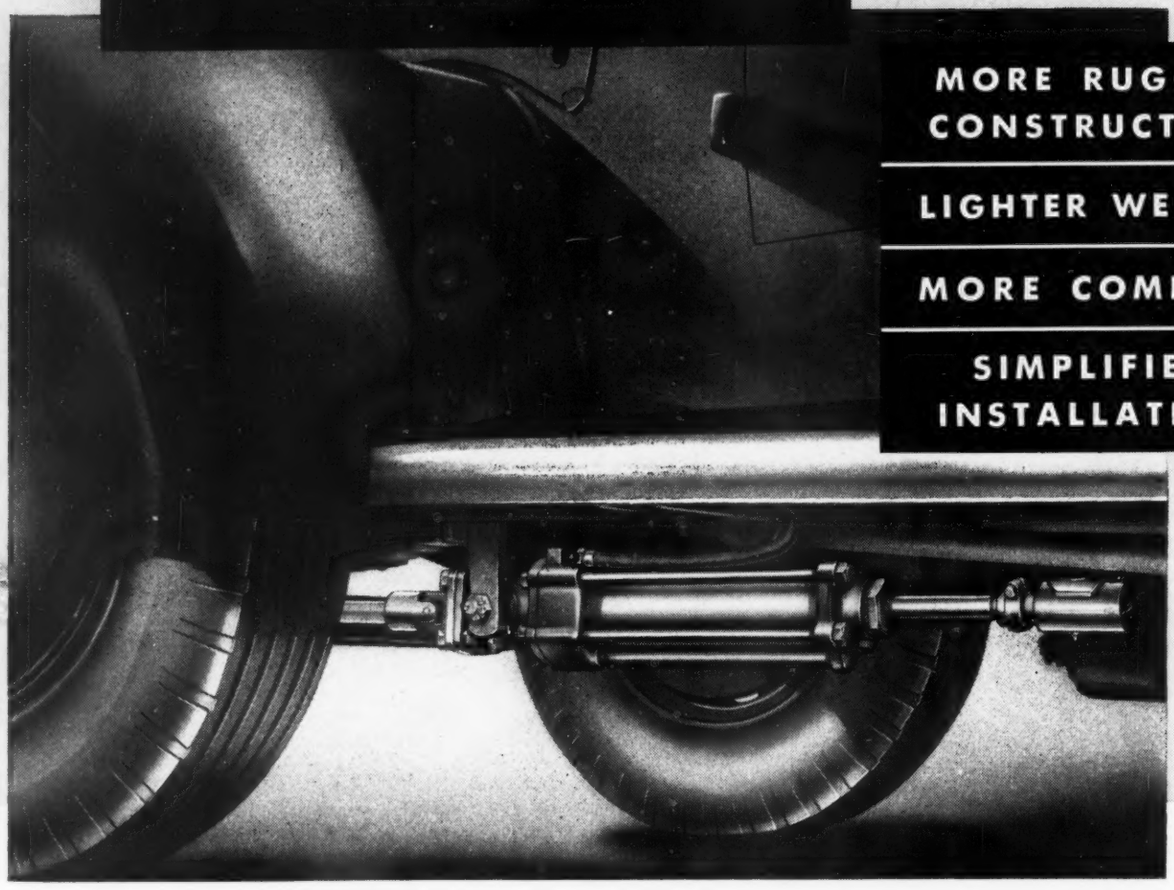


POWER BY
Red Seal
Engines
CONTINENTAL

BUILT FOR THE JOB!

Let Continental engineers help you select the engine built for your job. The services of the engineering staff and of modern Continental research equipment are available without obligation.

THE VICKERS *Hydraulic* POWER STEERING BOOSTER



MORE RUGGED CONSTRUCTION

LIGHTER WEIGHT

MORE COMPACT

SIMPLIFIED INSTALLATION

Added to the advantages always inherent in Vickers Hydraulic Power Steering are now lower price, a substantial saving in weight, more rugged and compact construction and an integral (instead of a separate) relief valve that greatly simplifies installation. More than a year's testing on city buses and heavy trucks under the most severe operating conditions has proved the redesigned Vickers Hydraulic Power Steering Booster (original design has been in use for 16 years).

The steering effort required can easily be supplied by your little finger . . . steering load is carried by the hydraulic cylinder . . . road shocks are not transmitted to the steering wheel . . . automatic protection against abuse . . . see new Bulletin 47-30 for all the facts about Vickers Hydraulic Power Steering System.

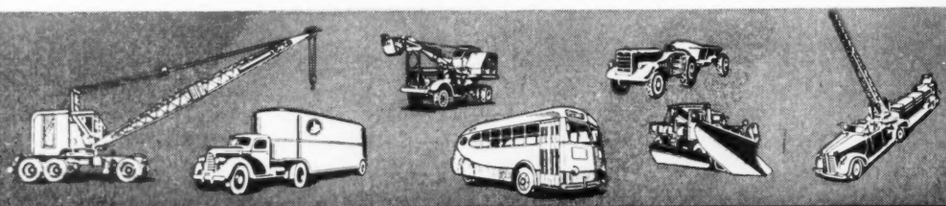
VICKERS Incorporated • 1494 OAKMAN BLVD. • DETROIT 32, MICHIGAN

Application Engineering Offices: • ATLANTA • CHICAGO • CINCINNATI • CLEVELAND • DETROIT • LOS ANGELES • NEWARK PHILADELPHIA • ROCHESTER • ROCKFORD • SEATTLE • TULSA • WORCESTER

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

***Write for* NEW BULLETIN 47-30**

Illustrating and describing the Redesigned Vickers Hydraulic Power Steering System.



Representative Applications of VICKERS *Hydraulic* POWER STEERING

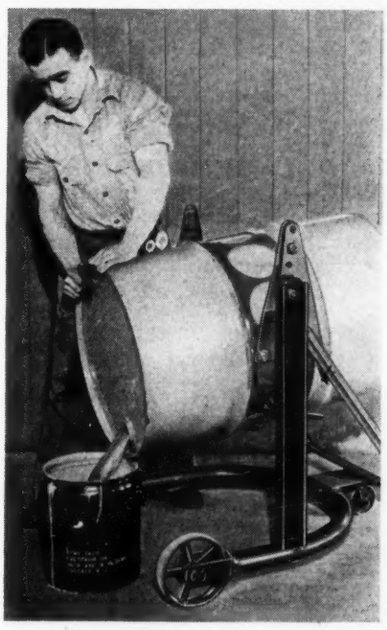
(*Continued from page* 112)

be performed without necessity for shop equipment. Integrally cast crank-case housing and aluminum cylinder block save weight, enable engine to deliver approximately twice as much per power pound of weight as similar conventional models. The 2¼-in. flatheaded aluminum piston has 2¼-in. stroke.—**Scott Engine Co., 1 North LaSalle St., Chicago 1, Ill.**

DOUBLE-DROP LOW-BED TRAILER—Fabricated of high tensile strength steels, a weight reduction of some 5,000 lb. in this new trailer over standard models will permit construction contractors who

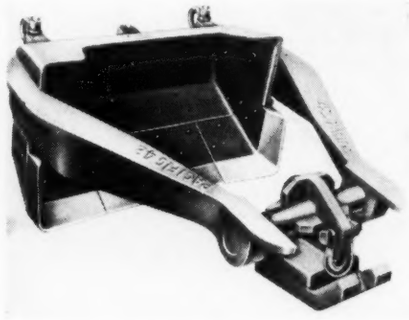
haul their own heavy equipment to carry a heavier load, cut maintenance costs, tire wear and operating expenses. In some instances it will allow moving of heavy equipment over roads previously barred by gross tonnage restrictions.—**Pointer-Williamette Co., Inc., Portland, Ore.**

DRUM HANDLER — Barrel-lift, Model 2, with patented pawl and chain link, offers simpler operation and greater durability. New gusset plate type lifting arms are made of heavier material and drum saddle is one-piece stamped welded assem-

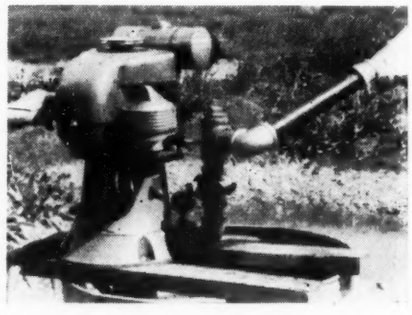


bly. Pick-up is simple, with safety-locked chain arrangement encircling drum. Self-locking safety stops provide fingertip safety control. Unit is heavy-duty, all steel welded construction. Shipping weight is approximately 113 lb.—**Falstrom Co., Box No. 118, Passaic, N. J.**

DRAG SCRAPER — Designed for haulage and transfer operations in mines, rock plants and quarries, this unit is scientifically "balanced" so that its entire weight goes into the digging action. Yet, when loaded, digging action ceases, relieving the scraper hoist of excessive power requirements. On the back haul the scraper tips back on runners, lifting the cutting blades above digging level, thus relieving them of excessive, non-productive wear and providing longer, more efficient service. In place of the conventional horizontal blades, scraper is equipped with newly designed, self-sharpening corner cutters which assure a more effective digging action. Shoe, which attaches to the front of the harness, is made of a tough, wear-resistant manganese steel which properly balances the scraper under all service conditions and protects the harness and cable shackle from wear. Scraper is massively designed to assure extra strength to take the maximum power of the hoist without distortion. Available in three models and six sizes: Model A, 26 and 30 in.; Model B, 36 and 42 in.; and Model C, 48 and 60 in.—**Alloy Steel & Metals Co., 1862 E. 55th St., Los Angeles, Calif.**



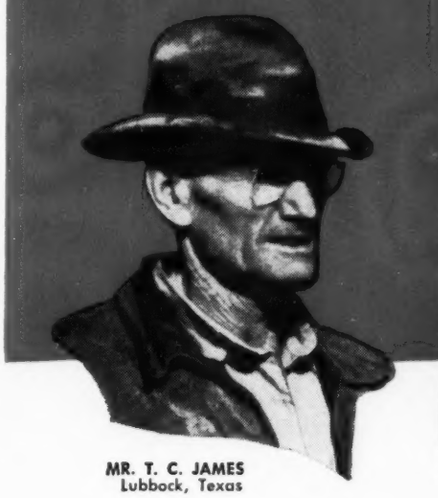
GASOLINE ENGINE DRIVEN PUMP — Lightweight portable self-priming contractors type pump with capacity of more than 6,000 gal. per hour will soon be available. Vertical shaft arrangement of engine provides compact design. Pump has only one moving part—cast bronze impeller with stainless steel shaft, which is directly coupled to engine crankshaft. Engine is two-cycle type of advanced design.—**Diesel Pump & Electric Mfg. Co., 110 W. Broadway, Glendale, Calif.**



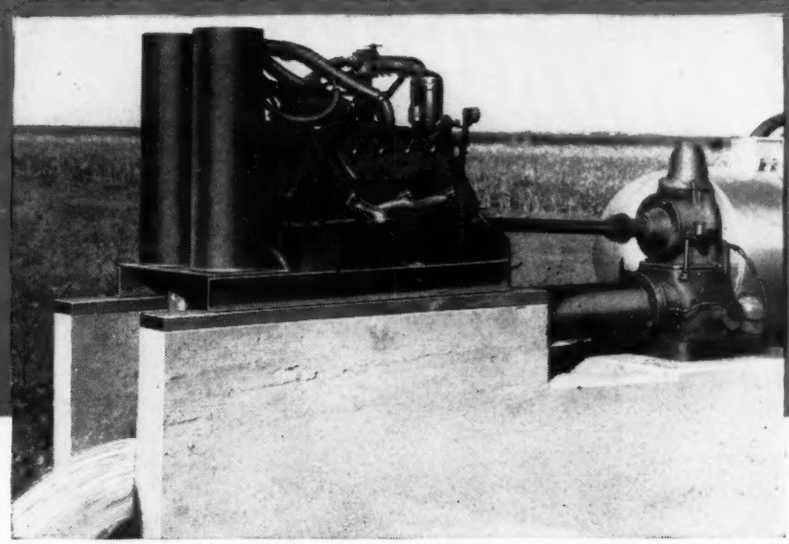
HYDRAULIC LOADER — Loadtrac is attachment for Ford-Ferguson tractor, designed for fast, powerful loading, digging and lifting. Unique design enables greatest hydraulic force to be exerted at "breaking-out" position, at which point it will lift 2000 lb. and sustain, at height of 8½ ft., 1000 lb. It raises to this height in 5 sec. and lowers to ground in 4 sec. Built-in, self-contained, hydraulic system provides instant, positive, finger-touch control with its power derived from heavy-duty, low pressure, 7½ gpm pump driven continuously by heat-treated spline drive from front of crank shaft. Thus positive loader operation is continuous as long as engine is run-

(*Continued on page* 124)

Wouldn't power like this do a real job on YOUR job?



MR. T. C. JAMES
Lubbock, Texas



This Ford V-8 engine has been in continuous service since 1941. It irrigates 125 acres planted to cotton and grain. Average fuel cost is 27 cents per hour, using butane gas.

"10,669 pumping hours—equivalent to 400,000 miles at 40 miles an hour—with only one ring job!"

That's what Mr. T. C. James, Lubbock, Texas farmer, writes from his cost records on this Ford engine.

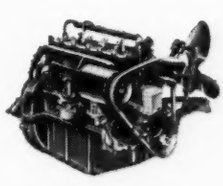
"Repeatedly, 5 and 6 months at a stretch, day and night, without major maintenance."

And Mr. James adds: "The average yield on dry land farming in this area was one bale of cotton to eight acres. I picked 145 bales off 107 acres!"

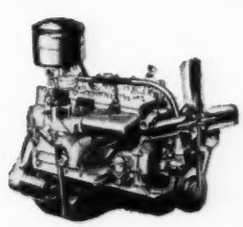
Ford A Ford-built engine, properly installed, is an asset in any piece of equipment—from everybody's point of view. It simplifies *manufacturing;* the source of supply is stable and service parts are available the world over. It helps *sell* the equipment, because the whole world knows and respects Ford engines. It is an enduring asset to the man who *buys* and *uses* the equipment, because Ford reliability, simplicity, economy and universal service facilities mean lasting satisfaction. So, whether you build, sell or use engine-powered equipment in the Ford power range, get your copy of the Ford Industrial Engine Catalog.

FORD MOTOR COMPANY
Industrial and Marine Sales Department
3506 SCHAEFER ROAD • DEARBORN, MICHIGAN

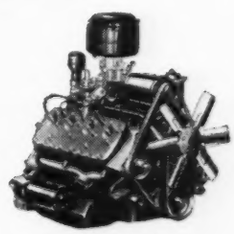
Ford engines are used to power—
Agricultural Machinery • Orchard Equipment • Air Compressors • Road and Construction Machinery • Derricks and Hoists • Electric Generating Plants Arc Welders • Fire-Fighting Equipment Industrial Tractors • Lumber and Saw Mill Equipment • Oil Field Equipment Pumps • Railway Motor Cars—and many other applications.



THE 40-H.P. FOUR
119.5 cubic inches displacement



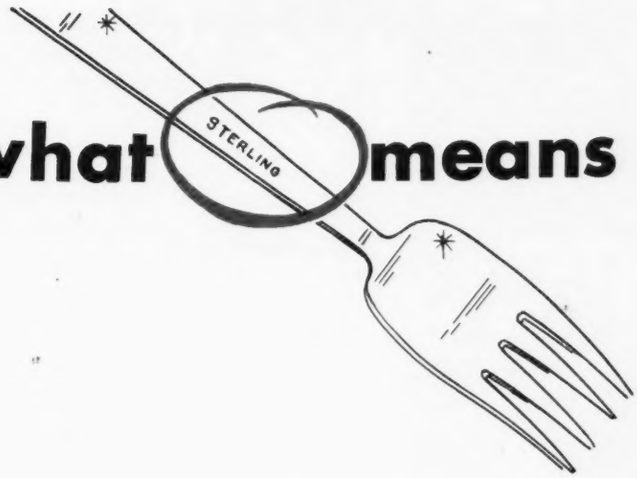
THE 90-H.P. SIX
226 cubic inches displacement



THE 100-H.P. V-8
239 cubic inches displacement

FORD-BUILT ENGINES

PREFERRED FOR INDUSTRIAL AND MARINE POWER



what means to silver...

means to mixers!

● In fine table service, "Sterling" is the hallmark of fine quality. On mixers and pavers, the equally outstanding symbol of quality is the AGC rating plate. Only equipment that has earned the right through guaranteed capacity and performance can wear these plates.

The plates represent outstanding reliability in action . . . enable you to make accurate estimates on jobs. They are your assurance of quality and capacity *in advance.*

Next time you buy, look for the AGC rating plate first and buy with confidence.

MIXER MANUFACTURERS BUREAU

Affiliated with the Associated General Contractors of America, Inc.

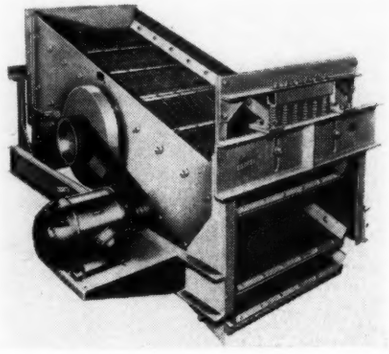
Member Names

Chain Belt Company Milwaukee, Wis.	**Ransome Machinery Co.** Dunellen, N. J.	**The Jaeger Machine Co.** Columbus, Ohio
Construction Machinery Co. Waterloo, Iowa	**Kwik-Mix Company** Port Washington, Wis.	**The T. L. Smith Company** Milwaukee, Wis.
Koehring Company Milwaukee, Wis.	**The Foote Co., Inc.** Nunda, N. Y.	**The Knickerbocker Co.** Jackson, Mich.

(*Continued from page* 120)

ning, without regard to clutch position. Frame serves as reservoir for five gal. of hydraulic fluid. Additional attachments available include material bucket, industrial crane, industrial lift-fork, bulldozer, sweep-rake, snow plow, and coal bucket. **—Loadtrac Co., 8 S. Michigan Ave., Chicago 3, Ill.**

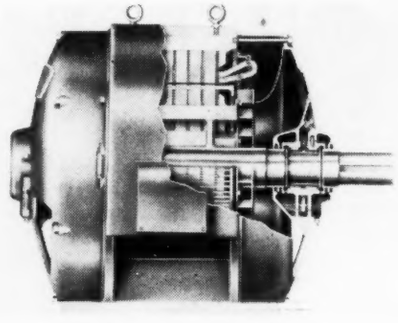
VIBRATING SCREEN — New Telsmith Vibro-King is two-bearing, heavy-duty vibrating screen recommended for finishing screening of medium and small-sized aggregates or those passing about 4 to 3 in. and smaller clear square openings and down to the finest mesh sizes. Vibrating unit is mounted in center of



live screen frame on two heavy-duty roller bearings and is equipped with two specially designed and patented, automatically adjusted and enclosed counterweights which prevent jumping at critical speeds. Main frame is horizontal for rigidity and ease of installation, and is usually supported from below. Suspension fittings, including cables and springs, can be furnished when desired.**—Smith Engineering Works, Milwaukee, Wis.**

SQUIRREL - CAGE INDUCTION MOTORS—Newly available heavy-duty squirrel-cage induction motors for large-power drives from 100 to 1,000 hp., 1800 rpm. and lower speeds are designed for drip- and splash-proof construction. Fabricated steel frame shuts out falling particles, makes operation quieter and invites

(*Continued on page* 126)



H-Section Welded Truss Has Wide Adaptability

By J. K. GANNETT, Vice President and Director of Engineering and Research
The Austin Company
Cleveland, Ohio

THE standard H-section welded truss designed by The Austin Company greatly simplifies the designing of one-story industrial buildings and effects many economies in their construction.

The truss, using H-Sections with all webs in a vertical plane and with all connections made by direct fillet welds without the use of gusset plates, is shop-fabricated in standard 50, 60, 70 and 80-foot lengths. It is readily adaptable to different loadings by simply changing the weights of the beams used for the various members. The depths need not be changed, thus standard jigs are used for economical fabrication. Fig. 1 shows one of the trusses being finish-welded.

The top chord is a wide flange beam that can carry purlins at a variety of spacings without regard to panel points, and is also adaptable to continuous uniform loading. The bottom chord can carry loads at any point and can be used as a monorail. See Fig. 2. Thus the truss is adaptable to a wide variety of loading demands and factory arrangements which ordinarily require specially-designed trusses.

Economical Fabrication

Fabrication is quite economical because it has been reduced to three simple operations: cutting the members to length, assembly and welding.

Since the truss members are abutting instead of lapping, it is important that they be cut to exact length and angle. A large friction saw is satisfactory for cutting the chord members, while an abrasive saw is used to cut web members to the exact angle required.

For assembly, the members are simply "laid in place" in the horizontal jig. Jigs greatly reduce production costs and insure that the webs of all members are placed in precisely the same plane. Monorail hoists are used to place the chords, but the short web members are usually so light that two men can quickly place them by hand.

After the truss is tack welded, it is removed from the jig and stood on its bottom chord, being held at the top by monorail hoists. The bottom chord joints are then finish welded as shown in Fig. 1. Then the truss is turned upside down and all top chord joints welded. This procedure permits 100% down-welding.

All of the welds are fillets, ranging from ¼" to ⅜", depending on the size of the truss and the location. A 50-foot truss requires a total of 41 lineal feet of fillet welds.

No Cut Edges Exposed

The fillets are run completely around the members at their end connections. Thus all cut edges are covered and only the original rolled surfaces are exposed, which increases resistance to corrosion and simplifies painting and maintenance.

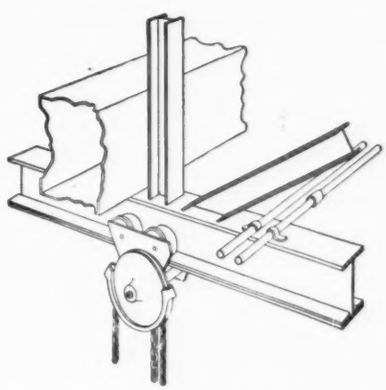


Fig. 2. How bottom chord can be used to support various loads and serve as monorail.

This fabrication procedure exemplifies the economy and simplicity obtainable in structures of good welded design. There is no punching, coping or chipping; no templates are needed; all welding is the simplest possible—horizontal fillet welding; and, except for the end connection, every pound of steel is in a truss member—there is no detail material such as gusset plates, fillers or stiffeners.

This truss has been thoroughly tested and has been—or is being—incorporated in Austin buildings, from coast-to-coast with an aggregate floor space of over three million square feet.

New developments in welded design are thoroughly described in "Studies in Structural Arc Welding," available free to engineers. Write The Lincoln Electric Company, Dept., 293 Cleveland 1, Ohio.

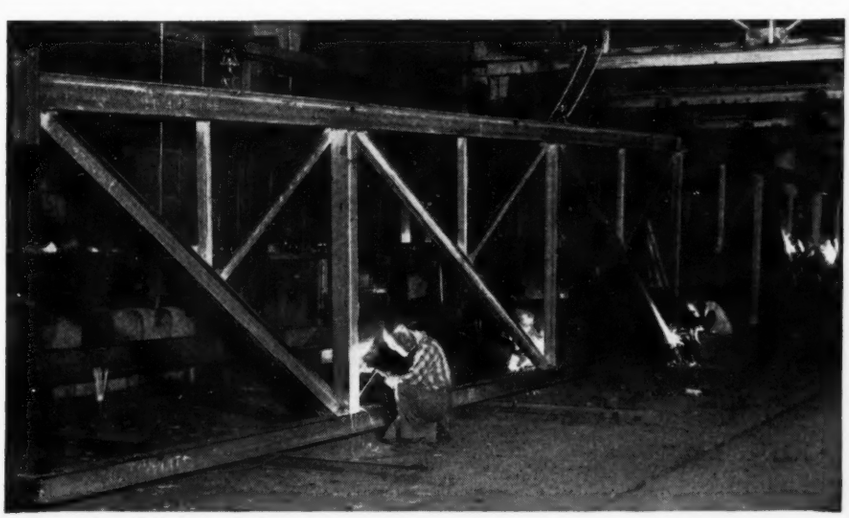
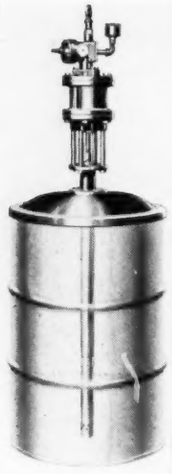


Fig. 1. Finish-welding diagona ana vertica web members to bottom chord of an H-truss.

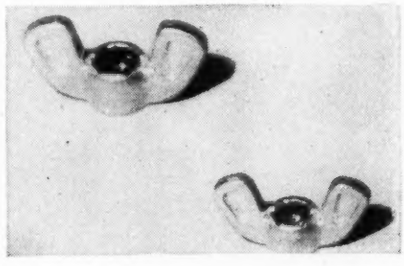
(*Continued from page* 124)

easy cleaning. Inspection and blowing out is simplified on larger ratings with access plates designed for speedy removal and replacement. Sealed bearings can be cleaned and refilled without motor disassembly. Double end ventilation is provided by a blower on each end of the rotor. Company also announces new heavy-duty synchronous motors for constant-speed drives up to 1,000 rpm.—**Electric Machinery Mfg. Co., Minneapolis 13, Minn.**



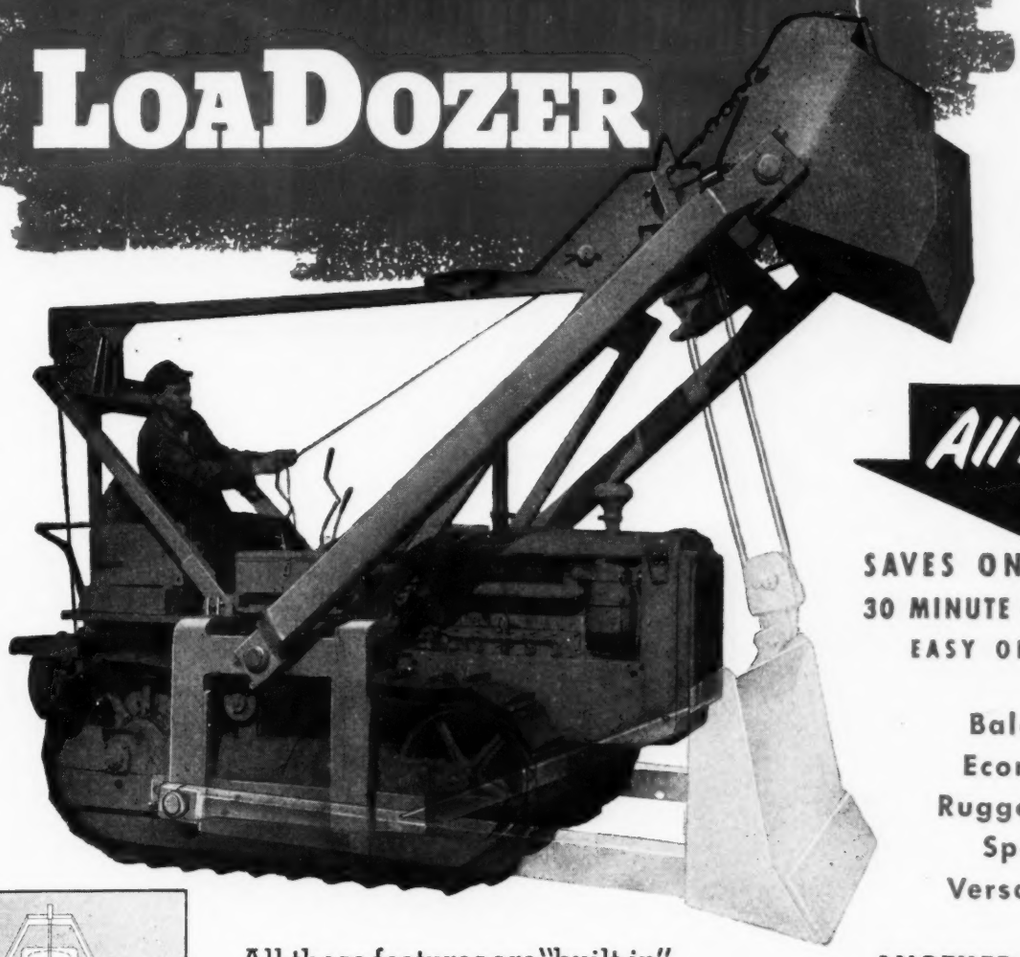
HEAVY - DUTY DRUM PUMPS—New line of air - operated heavily constructed drum pumps will handle lubricants, oils, sound deadeners, sealing materials, paints and many other compounds direct from original containers of 55 gal. capacity. They are available in drum cover types for full-opening drums and in bung-bushing types for mounting in drums equipped with 2-in. P.T. bung-hole. Both types are offered in seven pressure ratios, from 40 to 1 to 2 to 1, for any material requirement.—**Aro Equipment Corp., Bryan, Ohio.**

WING NUT—New self-locking wing nut, featuring red elastic nylon locking collar, has been developed to answer design requirements calling for convenience of wing nut, plus ability to lock in position anywhere



on bolt or stud. Potential applications exist on trucks, industrial equipment and special machinery. They are available in four diameters with both fine and coarse threads. —**Elastic Stop Nut Corp. of America, Union, N. J.**

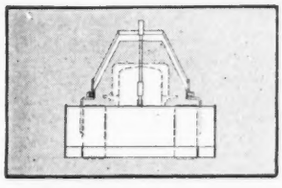
NOW-THE SOUTHWEST LOADOZER

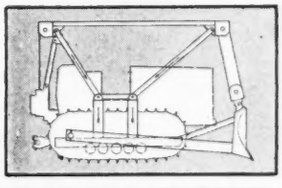


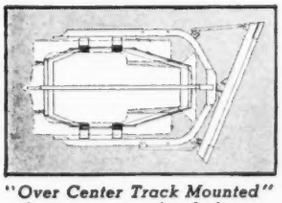
All this

SAVES ONE TRACTOR
30 MINUTE CHANGE-OVER
EASY OPERATION

Balance
Economy
Ruggedness
Speed
Versatility







"Over Center Track Mounted" design gives perfect balance

ANOTHER EXAMPLE OF *Southwest's* LEADERSHIP

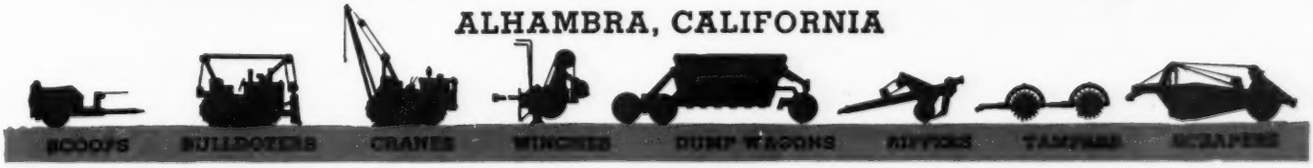
All these features are "built-in" qualities of the new SOUTHWEST "LOADOZER"—Extra values that mean greater efficiency and economy in Loader and Bulldozer operations. Remember—you SAVE ONE TRACTOR—it takes only 30 MINUTES TO CHANGE OVER this combination Loader-Bulldozer unit.

- Built for all four makes of track type tractors.
- See your equipment dealer about the complete line of SOUTHWEST CONSTRUCTION EQUIPMENT.
- For complete specifications on this Loader-Bulldozer combination unit—WRITE FOR BULLETIN CM-11.

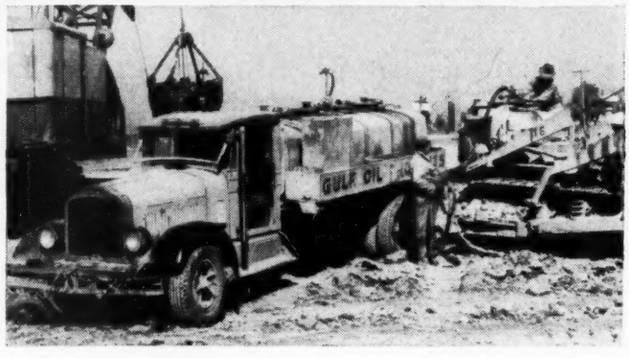
CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA



Gulf Quality Lubricants and Fuels help contractors keep big dock job *on schedule*



Walsh and Bates & Rogers have combined equipment and personnel to construct new coal docks at Toledo, Ohio, for the Baltimore & Ohio and New York Central Railroads. This $13,000,000 job involves moving 2,000,000 cu. yds. of earth, driving 15,000 wood pilings, 12,000 tons of sheet piling, pouring 25,000 yds. of concrete, and laying 60 miles of railroad track.

"GULF QUALITY LUBRICANTS AND FUELS have played a big part in our fast progress on this tough job," says S. C. Richards, General Superintendent. "In spite of punishing operating conditions, our equipment has delivered top-notch performance day in and day out—and we haven't had a serious mechanical delay."

Like many other leading contractors, Walsh and Bates & Rogers have found that Gulf quality lubricants provide a higher degree of protection when equipment is pushed to the limit—and that Gulf fuels contribute to maximum power and efficiency. Result: fewer delays, better all-round equipment performance, and a speedier, more profitable job!

Write, wire, or phone your nearest Gulf office and arrange to use Gulf quality lubricants and fuels on your next job. They are quickly available to you through 1200 warehouses located in 30 states from Maine to New Mexico.

GULF

Gulf Oil Corporation
Gulf Refining Company

Division Sales Offices: Boston · New York Philadelphia · Pittsburgh · Atlanta · New Orleans · Houston · Louisville · Toledo

YOUR CHANCES OF GETTING AHEAD

FOR 20 years we have been whittling away the foundations of our economic structure. We have been cutting away the incentives to "get ahead in the world," to increase production and to improve efficiency. Unless this process is reversed soon, we risk the sort of industrial stagnation that currently afflicts Great Britain so disastrously.

How far the whittling has gone is shown by the statement in the center of the page. It shows that everyone's stake in working harder and getting ahead has been reduced sharply since 1929. In that year, anyone who was even moderately successful could look forward to reaping the rewards of his success. If he earned $5,300 annually over a period of 25 years he could retire on a comfortable income of $3,000 per year. Or he could pile up enough capital to go into business for himself. He could fulfill the American dream as phrased by Abraham Lincoln in his first annual message to Congress in 1861:

"The prudent, penniless beginner in the world, labors for wages awhile, saves a surplus with which to buy tools or land for himself, then labors on his own account another while, and at length hires another new beginner to help him. This is the just and generous and prosperous system, which opens the way to all, gives hope to all, and consequent energy and progress, and improvement of condition to all."

Look at the situation today. To retire on an annual income from investment that will buy as much as $3,000 did in 1929, a young man needs to earn over $13,000 a year for 25 years. That's more than 2½ times the income he would have needed in 1929. The same thing is true of acquiring a stake in a business.

Although the dollar income needed for retirement rose 75% between 1914 and 1929, the average person's chances of getting ahead improved. This is because the average man's income was rising; it was double the 1914 level by 1929. So more people were within striking distance of success and security.

Why Try to Succeed?

It was a different story after 1929. The income needed for retirement today is two and a half times the 1929 amount. Meanwhile average incomes are up only 80%. So the average person's chances of achieving success are actually slimmer now than in a generation.

What is more, fewer people actually do achieve success today. Only one percent of all families now have incomes large enough to build up a retirement fund or acquire a stake in a business. In 1929, almost 6% of all families attained a comparable degree of success.

Higher taxes are the most important reason why it takes so much more now to build up a competence. They account for one-half the increase in the amount needed. The other half is explained by higher living costs and lower interest rates.

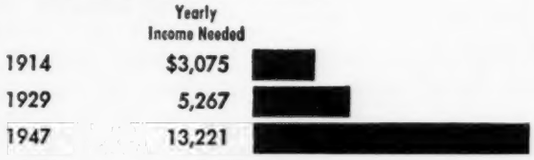
It is, of course, true that few people ever get into the higher income brackets. So the process of cutting away the incentives which play such a key role in our

YOUR CHANCES OF GETTING AHEAD

To see how your chances of getting on in the world have changed during the past few decades, the McGraw-Hill Department of Economics has calculated how much it now takes to save enough to acquire a retirement income or a comparable stake in a business, as compared to what it took in 1914 and 1929.

The objective set is an income from investment equal to $3,000 a year in 1929 dollars. It is assumed that the savings required to yield this income are made over a period of twenty-five years. During that period it is also assumed that $4,000 per year (in 1929 dollars) is spent on living expenses.*

Here is how the figures work out:



It now takes more than four times as large an annual income as it did in 1914 to gain a comparable stake. It takes well over twice as much as it did in 1929.

Changes in three factors — federal income taxes, living costs, and interest rates — explain why the income needed has multiplied so. Here's how these factors line up for the three years.

	Federal Income Taxes Married Man, 2 dependents		Cost of Living (Index Numbers 1935-39)	Interest Rate High-grade Corporate Bonds
	$5,000 income	$10,000 income		
1914	$10	$60	71.8	5%
1929	$3	$40	122.5	5%
1947	$589	$1,862	155.0	2½%

Similar calculations show that if we could reduce federal expenditures from $35 billion to $25 billion annually, raise interest rates by one-tenth and lower living costs by 15% — all realistic possibilities if we make the effort — then the income needed to build up such a retirement fund would come down to $9,500. The chances of realizing that goal would then be restored to what they were in 1929.

*Several other factors were omitted from the calculations because they would not have a decisive effect on the results. Thus, existence of social security pensions now reduces the income needed; but if state income taxes were added, the income needed would increase.

economic system affects comparatively few people immediately. It does, however, have a powerful indirect affect on all of us.

Everybody Loses

When half to four-fifths of any additional income of successful people goes to Uncle Sam a heavy drag is obviously put on doing the work to get it. Thus, we stand to lose the benefit of full use of the nation's best brains. By so doing we stifle industrial progress. And the loss in productive efficiency far outweighs the amount of tax revenue the Treasury gains. Carried far enough, the process of stifling economic progress by slashing rewards leads straight to industrial stagnation.

The same process also multiplies the risks of embarking on new capital investment. High taxes rule out all but the most profitable new projects and restrict most expansions to boom times when profits are high. So capital investment follows a boom and bust pattern and, by so doing, contributes much to ups and downs in production and employment.

The Sorry Plight of Britain

The case of Britain today provides an object lesson of how blighted incentives produce industrial stagnation. *Britain's number one economic problem is to get more production. But the tax load there is so heavy it stifles the incentive to produce more.*

A coal miner who works an extra shift pays about a third of his added earnings to the tax collector. And, as the London *Economist* comments, tax rates on business executives are so high that they kill every incentive except that to tax evasion. In short, not only is the incentive to succeed blighted, but so is the incentive to work.

A root-cause of Britain's trouble is this: The cost of an expensive program of social benefits has been piled on top of the heavy costs of paying for past wars and trying to prevent future wars. Tax rates are boosted accordingly. What her experience proves is that the attempt to provide excessive social benefits may defeat itself. It raises the tax burden on rich and poor alike and smothers the incentive to work. So the underlying basis of all economic benefits—production —is eaten away.

We in the U. S. haven't traveled as far down the stagnation road as Britain has. Taxes amount to about 26% of national income here as against about 45% there. But, unless we start soon to build up incentives to do better work, instead of whittling them away as we have been doing, we will catch up with Britain fast.

It's Late but Not Too Late

Can anything be done? Decidedly yes, *particularly by tax reform and reduction in the cost of living.* As far as interest rates are concerned, any large increase would raise excessively the cost of carrying our war-swollen national debt, and hence raise taxes. But some increase in what are now excessively low interest rates may well be both feasible and desirable.

Action on the tax front is the first order of business. Our jerry-built tax structure is the thing that is chiefly responsible for cutting the incentives to work harder. Two things are important: 1) Government spending must be pared to the bone; 2) The tax system must be completely overhauled to remove the shackles on all-out production.

The 56th editorial in this series, published in March, outlined major steps that need to be taken in remodeling federal taxes in order to increase incentives to individual and business enterprise. *The revenue bill now before Congress is no more than a short step in the right direction. Much more must be done to clear the way for high production and rising living standards.*

Lifting the blight which taxes now place on incentives would help cut the high cost of living. It would stimulate greater production and greater efficiency. But a further step is necessary. Part of the benefits of improved efficiency must be passed on to consumers in the form of lower prices.

In the past few years we have been following precisely the opposite course. In many cases wages have been increased all out of proportion to increased productivity. Result—soaring prices and a severe squeeze of the consumer, to which some greedy exploitation of war-created shortages has also contributed.

To Give Ability a Chance

Our basic and most crucial problem is to get back on the track which leads to higher production and improved living standards all along the line. We got off that track in the 30's. Then, we started scrambling for larger slices of the same pie instead of trying to produce a larger pie. Now the process of getting back on the track is greatly complicated by the tremendous tax burden growing out of the war.

Yet it's not too late to turn back from the road that leads to industrial stagnation. As the statement in the center of the page shows, we could restore the odds of getting ahead to what they were in 1929. Cutting the federal budget to $25 billion a year and putting the tax structure in good order are the crucial first steps.

By taking these steps soon, Congress can go far to restore the incentives to hard work and efficiency which have been so largely washed away in the past 20 years. If they are not taken the American dream of getting ahead by hard and effective work will exist only in the history books, and our children will inherit from us an economic order without opportunity, without hope. without individual liberty.

President McGraw-Hill Publishing Company, Inc.

THIS IS THE 59TH OF A SERIES

"PAY-DIRT" *in Roads of Native Soils*

Soil Stabilization sets the pace in today's road-building programs with money-saving advantages that come through the use of native, in-place soils.

And the machinery for bringing speed and efficiency to this low cost road building is ready. The new P&H SINGLE PASS STABILIZER has proved its efficiency in fulfilling these 8 basic requirements of processing native soils with any type of admixture:

1. Control processing depth for accurate proportioning
2. Pulverize the soil thoroughly
3. Blend materials uniformly
4. Create a true sub-grade
5. Disperse the liquid through the entire volume in measured quantity
6. Mix the coated material uniformly
7. Lay the completely processed material in a fluffy, even depth, ready for compaction
8. Do all these things in one pass—at a good rate of speed.

A typical example of P&H performance is given in caption at left. Contractors and Highway Departments planning the construction of base courses, light traffic roads, streets, airport runways, etc., may obtain complete details by writing us.

Soil Cement Stabilization in Oklahoma

Soils, ranging from sandy loam to light clay, were treated with 10% and 11% cement to a depth of 7 inches. Average processing speed — 1067 square yards per hour. 24-foot roadway completed in three 8-foot passes. Maximum length of roadway completed per day — .75 miles. Time: 10 hours.

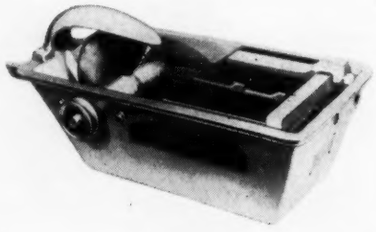
P&H **SINGLE PASS STABILIZERS**

4494 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

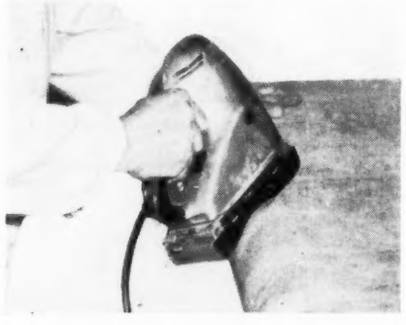
EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · HOISTS · WELDING ELECTRODES · MOTORS

TILE-CUTTING MACHINE — Equipped with a power-driven 8-in. diamond saw, this machine for use in rapid on-the-job tile cutting, combines portability with low power requirements. It has cast aluminum housing and weighs, without motor, 28½ lb. Dimensions, 11x21x6 in. Saw guard keeps saw and cutting contact amply supplied with water for maximum sawing speed and minimum wear. Relationship of saw and cutting table brings cutting action to bear at most efficient position to

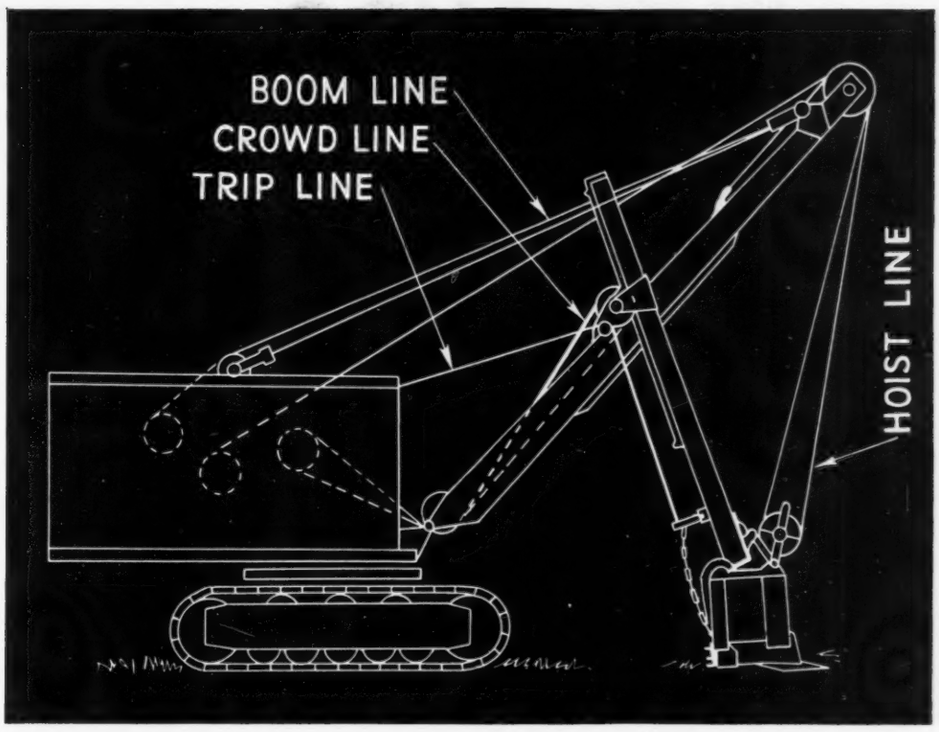


cut tile without wedging or dragging action. Tile cutting table moves on two rigid steel tubes ⅝x5 in., providing 27 sq. in. bearing surface. Cuts all standard sizes of tile. Protractor to enable cuts at desired angle and mitre guide are provided for bull-nose and cap-tile mitering. Table extension provides shelf for cut-off material to speed liner cutting. Accurate liners to ⅛ in. may be cut. Self-contained flushing system eliminates need for plumbing connections. Other features: Calibrated guide bar, adjustable stop and universal motor bracket.—**Hyatt Lapidary Equipment Co., East San Diego, Calif.**

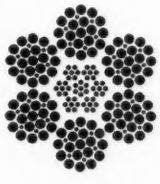
SPONGE RUBBER PAD—For machine sanding of curved surfaces (wood, metal, plastics, etc.) this unit is now available for use with the Sterling 1000 portable electric



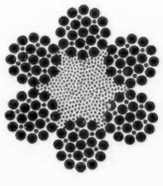
sander. With this flexible pad, convex and concave surfaces may be sanded easily and uniformly. Pad is faced with a 1-in. thickness of an oil resistant, cellular-type sponge rubber. Abrasive sheet is placed over flexible surface of pad in same manner as is done with standard sanding pad. Uses a 3 2/3-in.x10¼-in. abrasive paper.—**Sterling Tool Products Co., 363 E. Ohio St., Chicago 11, Ill.**



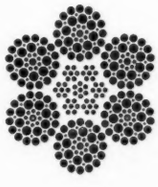
Things to know in buying Ropes for Power Shovels



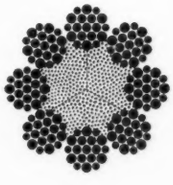
TYPE W
independent
wire rope core



TYPE W
fibre core



6 x 37 TYPE Q
independent
wire rope core



8 x 19 WARRINGTON
fibre core

Here are several important points to consider when you plan to rerig power shovels:

HOIST LINES must stand up under severe bending. They encounter some wear and are subjected to unusually heavy shock loads. For this service one of the most commonly-used ropes in diameters up to 1⅜ in. is a Bethlehem Purple Strand 6 x 19 Type W, with lang lay and independent wire rope core. The Form-Set (preformed) construction is widely specified.

BOOM LINES are more or less stationary. With little movement, there is little wear. A Bethlehem Purple Strand 6 x 19 Type W rope, with regular lay and independent wire rope or fiber core, is a popular choice. Lang lay is also commonly used.

CROWD LINES encounter bending, crushing, and wear. Purple Strand Form-Set 6 x 19 Type W with lang lay and independent wire rope core gives excellent service. Some shovels require 6 x 37 flexibility.

TRIP or DUMP LINES experience little wear. 8 x 19 plow steel, fiber core, regular lay, is usually satisfactory on small shovels; 6 x 19 Type W is preferable on large ones.

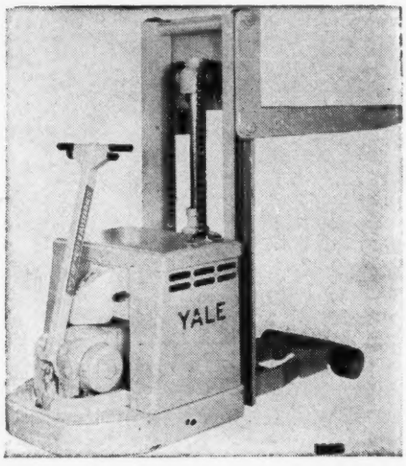
In cases of doubt, we strongly recommend that you consult a Bethlehem field engineer. It's part of his job to help you select the *right* wire rope for your equipment.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

When you think WIRE ROPE . . . think BETHLEHEM

ELECTRIC HAND TRUCK—Enthusiastic industry acceptance of so-called worksaver type of fully-powered hand truck has brought about new variation which permits load to be lifted to considerable heights from floor for purposes of stacking and picking up from elevated docks, racks or tailgates. This Yale high-lift platform model work-saver fills



need for equipment between simple hand truck and complete heavy-duty high-lift platform truck. Two models are already available—one with platform which can get under 7-in. skid and hoist it to height of 66½ in., the other with platform which can get under 11-in. skid and lift it to height of 70½ in. Both models have lifting capacity of 4,000 lbs.—**The Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.**

DOUBLE VAT KETTLE—Heet-Master double vat kettle, Model 120-DVP, has been designed and produced for use with new rubber sealer compounds. This new unit uses double boiler heating principle to provide uniform, thermostatically controlled, indirect heating that is absolutely essential before application of all rubberized asphalt joint sealing compounds.—**Aeroil Products Co., Park Ave., at 57th St., West New York, N. J.**

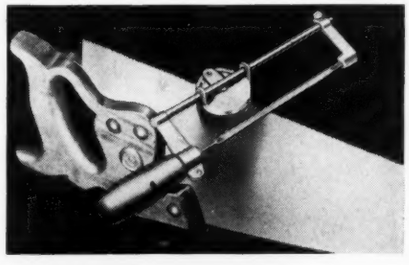
EXTRA-DUTY FLEET MOTOR OIL—Cleaner engines, more power, improved gas and oil mileage, and smoother, more dependable lubricating performance are claimed as advantages gained from the use of this product, called Amalie E-D, by gasoline-driven fleets. New oil is designed to protect against carbon and varnish formation, sludge deposits, bearing corrosion, and breakdown or deterioration of the oil itself and contains ingredients formulated to keep engines cleaner, assure quick, easy starting, aid in prolonging

(*Continued on page* 134)

(*Continued from page* 132)

engine life, reduce ring sticking, and keep oil and gas consumption to a minimum. Other properties: Ability to prolong oil filter life, end dry starting, overcome foaming troubles, and purge and wash away harmful products of combustion. — **Amalie Division of L. Sonneborn Sons, Inc., 88 Lexington Ave., New York 16, N. Y.**

SAW FILER—Hand filing guide that enables anyone to sharpen hand saws is said to fill an important need of carpenters and home craftsmen as well as large scale builders. It



makes saw sharpening an easy operation and does away with inconvenience and delay of sending saws out for filing. Only two positive adjustments are required to set correct pitch and angle for any type of hand saw.—**Speed Corp., 2025 Sanfy Blvd., Portland, Ore.**

IT'S GOT WHAT IT TAKES

to do the job!

The GENERAL Biting into the mucky clay, getting a full dipper load . . . swinging around and up, reaching 'way out . . . dumping the load exactly where it's wanted! In less time than it takes to tell it, the GENERAL power shovel has completed the operation and is swinging back for more.

Over and over again, under the most difficult conditions, finishing the work in a hurry . . . that's the way a GENERAL power shovel is built to operate. The record tells why you can depend on a GENERAL to come through, time and again, with efficient, low-cost operation. That means time, money and manpower saved on your job when you've got a GENERAL. Plan now for the time when you, too, can enjoy the advantages that only a GENERAL can provide. The new GENERALS, tested and proved in service, will be ready soon . . . . . information is available now.

THE RECORD: 98% OF ALL THE GENERALS EVER BUILT ARE STILL IN ACTIVE SERVICE!

POWER SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • BACKHOES • PILE DRIVERS

THE OSGOOD CO. O-G THE GENERAL CO.

EXCAVATOR

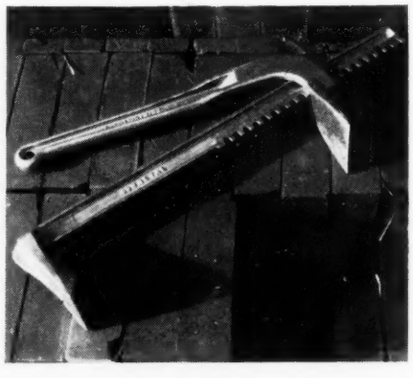
MARION OHIO

DIESEL, GASOLINE OR ELECTRIC POWERED • ⅜ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES

80-TON REAR-DUMP TRUCK — This 40-ton capacity unit, recently completed in the company's experimental department, is powered by a 12-cylinder Supercharged Cummins Diesel engine of 550 hp. Front tires are 18x24; eight tires on the two drive axles are 16x32. Manufactured

by Goodyear Tire and Rubber Company, they measure 5 ft. 6 in. in dia. Gross weight of the truck with capacity payload is approximately 80 tons. Still in the experimental classification, this huge truck has been shipped to a mining property of M. A. Hanna Co. on the Mesabi Iron Range in Minnesota where its performance is being tested.—**The Euclid Road Machinery Co., Cleveland 17, Ohio.**

LIGHTWEIGHT MAGNESIUM BRICK TONGS—Weight of this unit is 2¼ lb., whereas a comparable steel tongs weighs about 6½ lb. Tension spring and tooth gears permit quick and easy adjustment for all



types of bricks and insure safe handling. Available also is a lightweight plasterer's hawk made of magnesium weighing 1 lb. 11 oz. Sponge rubber hand cushion is bonded to the wooden handle for greater comfort of the worker.—**Specialty Products Div., The Dow Chemical Co., Bay City, Mich.**

"POCKET" FILTER PLANT—Construction crews and groups traveling away from approved public water supplies can now be sure of safe drinking water wherever they go with pocket-size filter plant called Mini-Filter. This device includes hand pump and filter together with

(*Continued on page* 138)

GOVERNOR OF *Friction*

(Herschel Coefficient of Friction)

As power is the life blood of industry, friction is the deadly poison that can slow wheels, reduce efficiency to the point of disaster.

Correct lubrication, obviously, is the preventive which protects power against the depredations of friction. And . . . the coefficient of friction of a lubricating oil is an important factor in the utilization of input power in all machines.

Sinclair Research is ever alert to aid you in developing maximum output from your equipment with such apparatus as the Herschel Coefficient of Friction machine, shown above. This machine is invaluable where lubrication of all parts of machinery is concerned.

With such apparatus and the continuous effort of skilled experts in refinery control, Sinclair assures you of outstanding performance from lubricants developed specially for your specific application.

Sinclair Automotive Lubricants
FOR MINIMUM FRICTION—MAXIMUM POWER

OPALINE MOTOR OIL

OPALINE TBT OIL
(For severe service)

TENOL (Heavy Duty—For Diesels)

OPALINE GEAR LUBRICANTS

OPALINE CHASSIS LUBRICANT

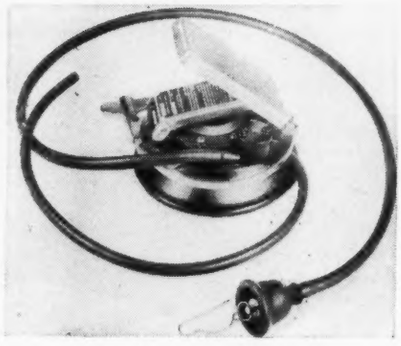
SINCOLUBE (For Wheel Bearings)

SINCLAIR REFINING COMPANY • 630 FIFTH AVENUE, NEW YORK 20, N. Y.

SINCLAIR

Lubricants for Industry

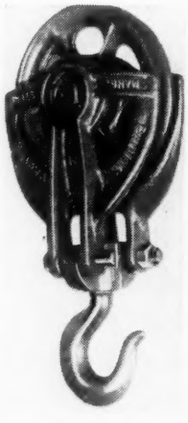
FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE



(*Continued from page* 136)

purifying kit (Aqua-Tabs) in unit weighing less than 5 lb. Principle of operation is same as that used by municipal filter plants.—**Wallace & Tiernan, Belleville, N. J.**

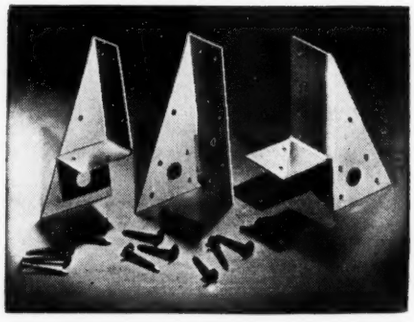
INSULATION — Ferro-Therm steel insulation is reflective insulation with all qualities of steel, permanent and fire-arresting. Tin-alloy coating makes it non-corrosive. Though only 0.006-in. thick, it acts as temperature moderator all year-round. It does not harbor vermin or rodents, or absorb moistures or odors of any kind. Stapled permanently in place, it cannot settle or pack down.—**American Flange & Manufacturing Co., 30 Rockefeller Plaza, New York, N. Y.**



QUICK - OPENING SHEAVE BLOCKS — Designed for heavy-duty mine and construction operations, Type C sheave blocks are constructed with manganese steel sheaves and manganese steel side plates to provide great strength with a high safety factor and extreme resistance to wear. Equipped with heavy-duty, anti-friction, sealed bearings, they are of the quick-opening, "snatch-block" type construction. Sheave rims are recessed into the side plates to prevent rope fouling and to reduce rope wear. Rope channel of the sheaves is wide and deep and the throat of the block is wide enough to pass a square knot in wire rope. Hooks, shackles, and yokes are made of alloy steel. Made in 8-, 10- and 12-in. sizes and available with hook, safety shackle or safety swivel shackle.—**Alloy Steel & Metals Co., 1862 E. 55th St., Los Angeles, Calif.**

AIR VALVES—New line of hand - operated air valves for crane control and the like utilizes balanced piston principle. Pistons are held in position by air pressure. Linkage or mechanical connections between pistons and operating lever are eliminated. This reduces number of moving parts and contributes to ease of maintenance as it is never necessary to disconnect pistons from operating lever. Made of cast alloy aluminum, this 3-position lever, 4-way valve is completely streamlined. It is designed and manufactured for 175-lb. maximum working pressure and all inner parts are made of stainless steel and bronze.—**Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12, Ill.**

FRAMING ANCHOR—New timber connector, known as framing anchor, used in home and light construction to increase rigidity around window and door openings and as added strength in floor and wall framing is made of 18-gage zinc



coated, corrosion-resistant sheet steel. Anchors are joined to wood with non-splitting full bodied nails that develop maximum shear without splitting lumber. Known as Trip-L-Grip framing anchors, devices have been laboratory tested at Georgia Tech.—**Timber Engineering Co., 1319 18th St., Washington 6, D. C.**

ELECTRODE—Airco No. 375 electrode for machinable welds on cast iron has high nickel core wire and heavy extruded coating that has possible application wherever electrode is used on cast iron. Ordinarily preheating is not necessary. Because of its high nickel content, electrode flows well and resultant deposit is sound. Weld and fusion zone is soft and easy to machine. Also it will withstand hydrostatic pressure and may be used with ease in downhand, vertical or overhead positions. Multiple pass welds can be made without danger of cracking.—**Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.**

Uncover larger earthmoving Profits

. . . roll back the dirt quickly with Heil Hydraulic Bulldozers

The dirt really rolls back when you use a Heil Hydraulic Bulldozer. Yardages are bigger — costs lower. The secret of this unequalled rolling action lies in the design of the Heil Bulldozer blade. The scientific contour of this blade, developed after many years of earthmoving experience, provides a cleaner cutting action and a bigger load-carrying capacity without increasing size or weight. The cutting edges, made of special wear-resistant steel, are reversible. The additional life gained is just another of many Heil cost-cutting features. Here are a few more that save you time and money on any job:

The easy-handling, trouble-free Heil hydraulic unit provides quick finger-tip control. The positive action enables the operator to place the blade exactly where he wants it — he can dig faster and move more dirt. The all-welded, box-section construction, the sturdy connections, and the proper distribution of loads and stresses keep your tractors on the job longer — making bigger profits for you. Install a Heil Hydraulic Bulldozer on your Oliver-Cletrac as soon as possible. It's an easy, quick mounting job. See your Oliver-Cletrac distributor.

Heil Dump Bodies and Hoists are built to take the punishment of tough working schedules—there is less time out, less expense for repairs, and you haul more loads per day, when these long-life units are on the job.

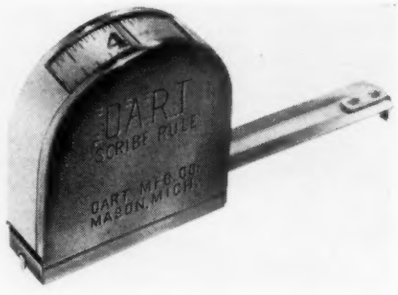
Your local Heil distributor has all the facts about Heil Twin-Arm Hoists and Bodies.

R-86

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

PRECISION SCRIBE RULE — Accurate measurements on both outside and inside dimensions are assured by equipping unit with a plastic window on which are marked by a hair line the measurements to a 32nd of an inch. Tape is full 6 ft. long, and of heavy spring steel. For

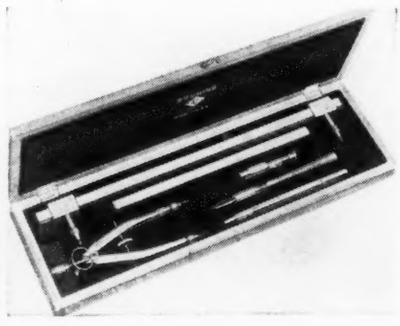


easier marking of the measurement, there is provided a scribe on the left-hand side of the tape, housed for protection when not in use, but protruding upon slight pressure to mark the desired measurement. An oil-filled felt pad cleans the tape whenever it is used. Steel case has a heavy chrome finish both inside and out.—**Dart Manufacturing Co., Mason, Mich.**

MOISTURE - RESISTING PAPER — Moisture and vapor resisting paper known as Presstite barrier paper for building industry has gained widespread acceptance in building and construction industries. It forms moisture and vapor barrier for side walls between sheathing and facing materials, under flooring and for roof decks. Paper is excellent grade of tough kraft paper saturated and coated with highest grade of gilsonite, asphalt and wax compound. It is black, has good flexibility and no odor and will not shrink after wetting.—**Presstite Engineering Co., 3900 Chouteau Ave., St. Louis, Mo.**

DRAWING SET — Instruments in new drawing set consist of beam compass with 8- and 13-in. beams; 6-in. giant bow compass; ruling pen with club style wood handle and draftsman's refillable pencil that can be converted into double-point

(*Continued on page* 144)



(Continued from page 142)

pencil. Exclusive feature of beam compass is rapid, simple and positive adjustment of needle and pencil blocks on beam. New patented feature of ruling pen is calibrated adjusting collet that enables user to regulate opening of nibs and at same time record desired setting for future use. Giant bow compass also has new patented feature—lead of pencil part can easily be advanced by slightly turning adjusting collar of chuck. Drafting pencil has patented metal chuck that grips lead evenly and snugly, distributing pressure over wide area and thus eliminating scoring and nicking of lead. **—Charles Bruning Co., 4754-18 Montrose Ave., Chicago 41, Ill.**

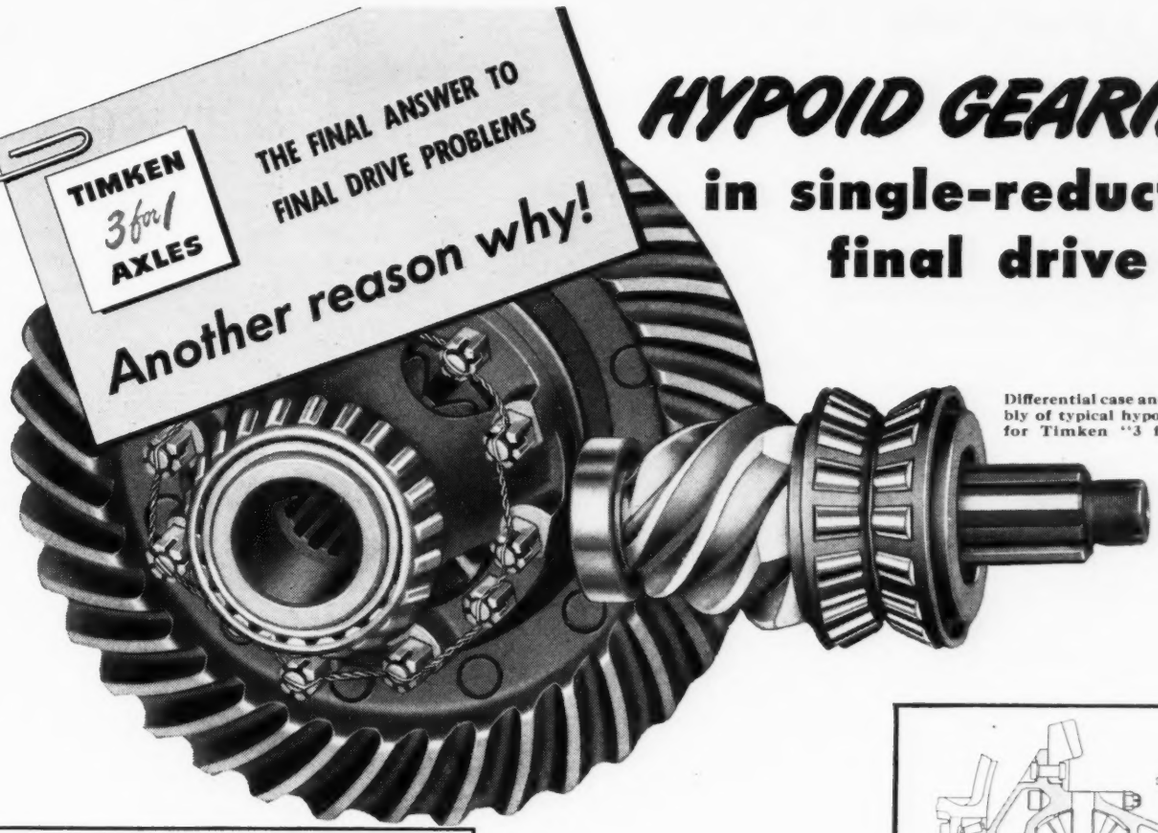
RUST REMOVER—Liquid rust remover produced is marketed under name CorOdex. Caims for new rust remover are that it is amazingly effective on any metal surface, that it will remove even thickest coat of rust, that it is so penetrating it reaches pin point spots, pits, crevices, cracks or corners and that it can be applied in minimum of time with paint brush or cotton swab.— **Allied Products Co., 1133 W. Newport St., Chicago 13, Ill.**

TIMKEN 3 for 1 AXLES

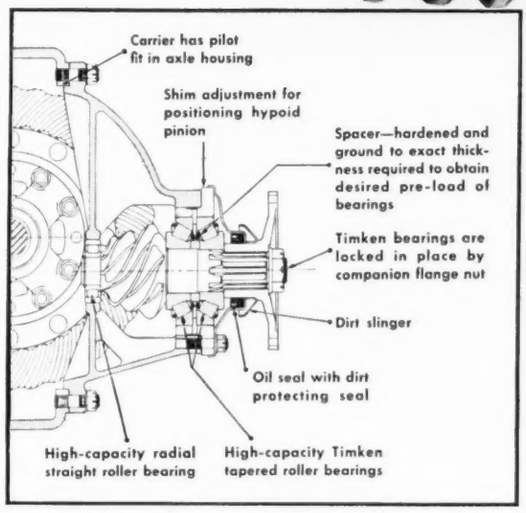
THE FINAL ANSWER TO FINAL DRIVE PROBLEMS

Another reason why!

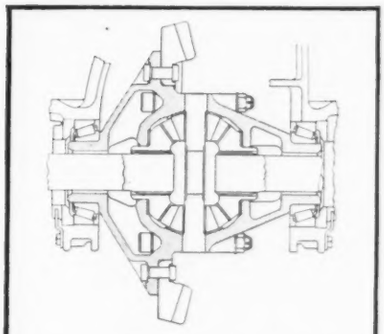
HYPOID GEARING in single-reduction final drive



Differential case and gear assembly of typical hypoid final drive for Timken "3 for 1" Axle.



Improved Timken hypoid pinion bearing mounting. This construction provides a rigid mounting to resist any movement of the pinion under load.



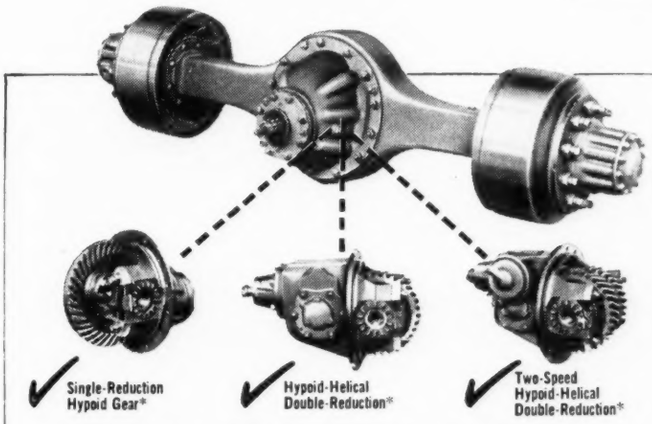
New "Conical-Truss" design differential case makes possible an unusually rigid mounting for the hypoid gear, reducing deflection under radial and thrust loads to a negligible minimum.

Increased torque capacity, sturdier pinion bearing mounting, longer life and increased dependability, slower gear ratios for high-speed engines with increased durability—you get all these and many more Hy-Performance benefits from Timken's new line of "3 for 1" single-reduction axles with Hypoid Gearing.

These are reasons enough to make cost-minded operators cheer.

But what makes them keep on cheering are: A new and stronger "Conical-Truss" differential case (right), a new and stronger housing with "Full-Corner" rectangular section at the spring seat, a new hollow-rib differential carrier housing, new and stronger axle shafts with 16 slant-sided splines and increased root diameter . . . plus enough other new features to fill this page.

The point is: Look *under* the next new trucks you buy. Specify Timken "3 for 1" Axles—to fit your trucks to the job they are to do—to get the *final* answer, the *modern* answer to your final drive problems.



✓ Single-Reduction Hypoid Gear*

✓ Hypoid-Helical Double-Reduction*

✓ Two-Speed Hypoid-Helical Double-Reduction*

*INTERCHANGEABLE IN SAME AXLE HOUSING USING THE SAME AXLE SHAFTS

TIMKEN 3 for 1 AXLES

THE TIMKEN-DETROIT AXLE COMPANY
DETROIT 32, MICHIGAN
WISCONSIN AXLE DIVISION, OSHKOSH, WISCONSIN
TIMKEN AXLE BRAKE DIVISION, DETROIT, MICHIGAN

New PUBLICATIONS From MANUFACTURERS

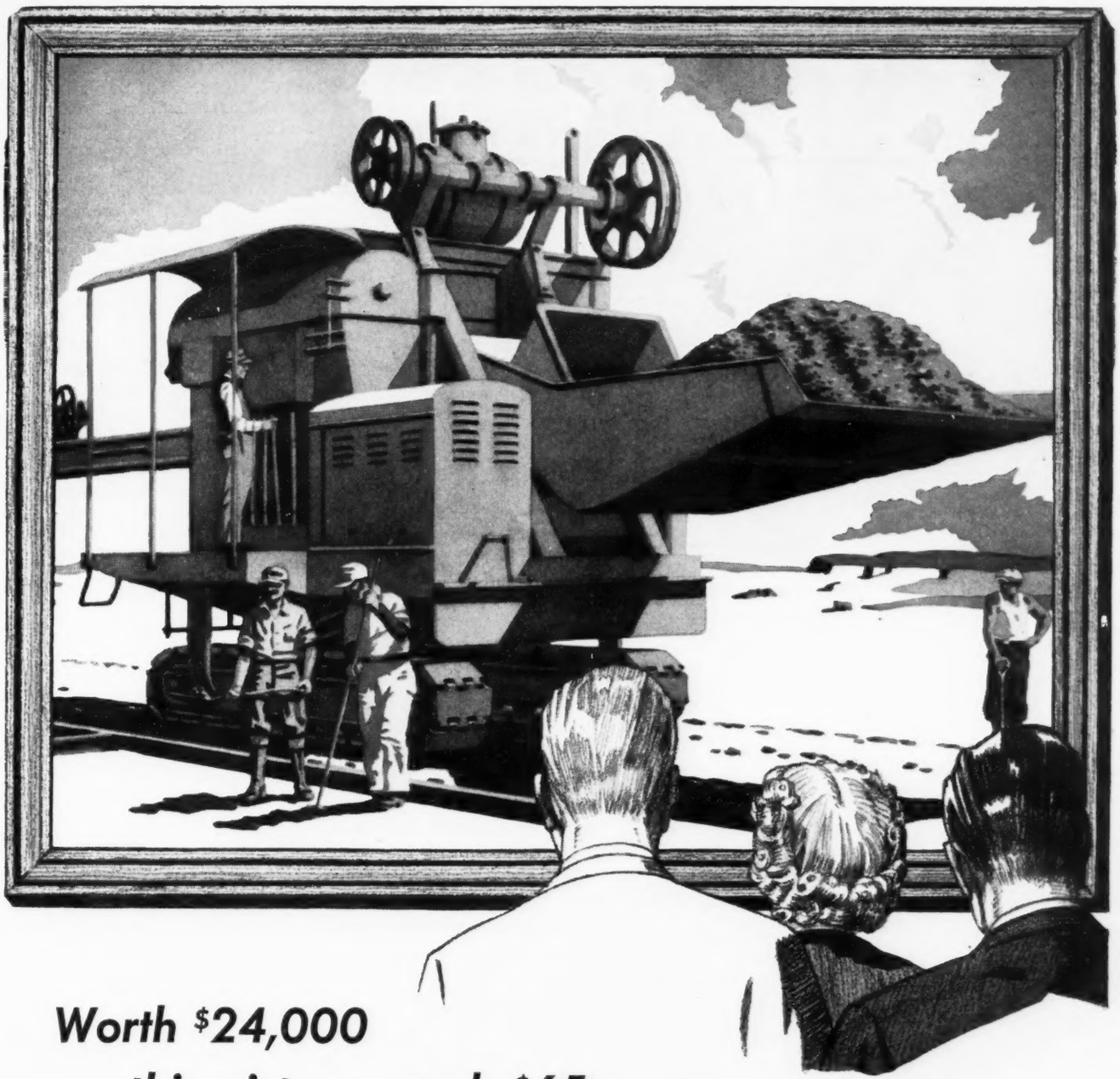
The catalogs and bulletins reviewed below will keep you posted on latest developments in construction equipment and materials available for your use

LEARNING TO WELD — (32-p. booklet) Provides simple basic approach for anyone interested in making start in arc welding. Its purpose is to teach how to weld and to assist in applying arc welding to repair of broken parts, hard surfacing of worn parts and building of miscellaneous equipment. Subjects treated include protective clothing and equipment; striking the arc; various welding positions; types of welds; fit-up of parts; procedures for various welds including fillets in horizontal, flat, vertical and overhead positions, butt welds, lap welds, corner and edge welds; welding cast iron; hard surfacing. Priced at 25 cents per copy.—**The Lincoln Electric Co., Cleveland, Ohio.**

CONCRETE MIXERS AND PAVERS—(Industrial data sheet) Sets forth causes of injury in operation of concrete mixers and pavers and recommends means for preventing accidents. Methods for guarding mixers and essential requirements for job planning are presented, as well as operating rules for pavers, mixers, engines and general activities related to maintenance and use of machines. Copies are available at low cost—**National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill.**

EQUIPMENT IN ACTION — (16-p. color booklet) Stresses applications of company's entire line of products—diesel-powered track and wheel-type tractors, diesel motor graders, diesel industrial and marine engines and electric sets, bulldozers, scrapers, cable controls and wagons. —**Caterpillar Tractor Co., Peoria 8, Ill.**

TREATMENT OF EXTERIOR WALLS—(4-p. folder) Tells story of Hydrocide Colorless, invisible water-repellent treatment for exterior concrete and masonry building walls above grade. Comparative test data are included, as well as results of water-repellency tests made on concrete, masonry and Celotex.—**Building Products Division, L. Sonneborn Sons, Inc., 88 Lexington Ave., New York 16, N. Y.**



Worth $24,000

. . . this picture needs $65 more

This efficient, fast, labor-saving road-paver cost well over $24,000—but it couldn't pave a square foot without wire rope. *That's* what is missing in the picture. How much does the missing wire rope cost? Well—ordinary, non-preformed wire rope costs about $52. The best of all wire ropes—Preformed Improved Plow Steel costs about $65.

Be safe. Be sure. If you use wire rope, use the best. Specify Preformed Improved Plow Steel for your next rope. And when you buy a machine—any machine—make certain it is equipped with Preformed. You will like it because it lasts longer. Your workmen will like it because it is easier and safer to handle.

WRITE FOR FREE COPY of helpful book about Preformed.
Address: Preformed Wire Rope Information Bureau,
520 North Michigan Avenue, Chicago 11.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

WIRE ROPE HANDLES EASIER - LASTS LONGER

STUD WELDING—(36-p. brochure) Describes application of stud welding in construction industries. Wide range of studs, used for securing corrugated asbestos and other types of roofing and siding, metal lath, insulation, and other integral construction materials to structural steel frames, is shown, along with various types used in the installation of mechanical, electrical, and sprinkler equipment.—**Nelson Sales Corp., Toledo Ave. and E. 28th St., Lorain, Ohio.**

SURFACE COATING—(6-p. folder) Describes Barriercoat, new moisture-proof, vapor-proof, corrosion-resistant coating for wood, metal, concrete and other surfaces, which is used in moisture-proofing basement walls, insulated siding, or wherever moisture or moisture vapors are undesirable. — **Carbozite Protective Coatings, Inc., Greensburg, Pa.**

VIBRATING CONCRETE BLOCK MACHINE—(Illustrated folder) Describes and gives specifications for "Little Giant" model.—**J. W. Appley & Son, Inc., 831 9th St., North, St. Petersburg, Fla.**

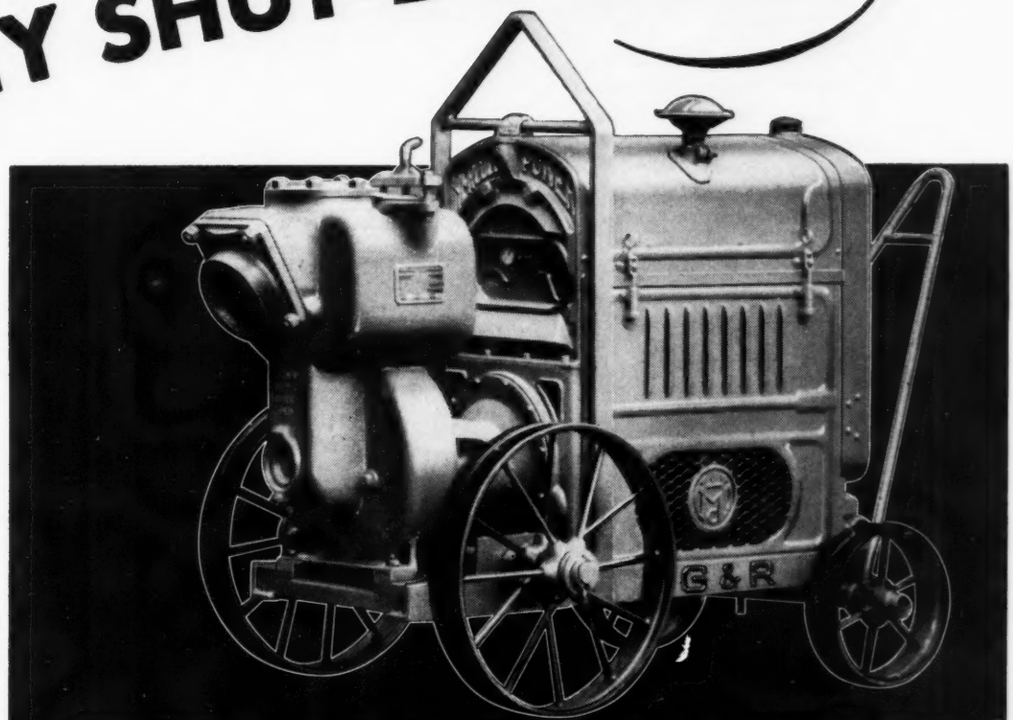
FINANCING PURCHASES OF CONSTRUCTION EQUIPMENT — (8-p. booklet) Points out advantages and explains how contractors can arrange C.I.T. financing for their equipment purchases.—**C.I.T. Corp., 1 Park Ave., New York 16, N. Y.**

AIR INLET VALVES—(16-p. bulletin) Contains complete data on use of valves, with all facts needed to put them into use as protection against collapse of thin-walled, gravity flow pipe lines. — **Simplex Valve & Meter Co., 6751 Upland St., Philadelphia 42, Pa.**

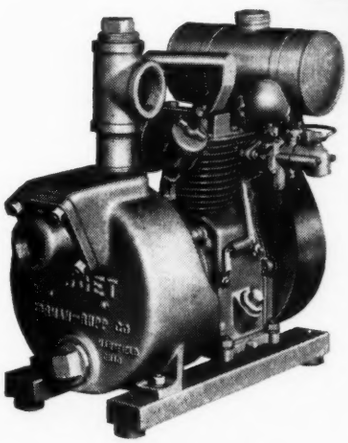
DEWATERING BY CONTRACT — (16-p. booklet) Outlines advantages of subcontracting draining of construction areas. Booklet features use of Moretrench wellpoint equipment. —**American Dewatering Corp., 140 Cedar St., New York 6, N. Y.**

STEREOGRAPH PERSPECTIVE DRAWING INSTRUMENT — (8-p. folder) Describes complete operation of stereograph, showing how it produces perspectives to hair-line accuracy without vanishing points, grids, outriggings or other cumbersome accessories.—**Pomeroy Stereograph Co., Inc., 318 Ferguson Bldg., Cleveland 14, Ohio.**

Eliminate COSTLY SHUT-DOWNS



GORMAN-RUPP PUMPS *Stay "On-the-Job"*



Gorman-Rupp Lightweight Pumps are exceedingly valuable for all kinds of odd jobs where heavy pumps are not necessary or are impracticable. The "Midget" pictured here, the smallest of the lightweights, weighs only 60 lbs. and will pump 3000 G. P. H. at ordinary heads.

Three months continuous runs without shut-downs are common occurrence with Gorman-Rupp self-priming centrifugal pumps. Five years without repair are frequently reported.

The reason for such performance is built into all Gorman-Rupp pumps. It's the simplicity and good design; the streamlined inside construction with no traps or obstructions to stop the free flow of water -- muck and solids will not clog the pump; the greater priming simplicity pays off in more work for less fuel and power. All these and other features make Gorman-Rupp centrifugal pumps the most efficient and trouble free pumps you can buy. They will out-perform and out-live any other comparable equipment.

Originators in 1936 of the Famous Blue Pump that others now imitate.

THE GORMAN-RUPP COMPANY

308 BOWMAN STREET • MANSFIELD, OHIO

EQUIPMENT MEN
and Their Companies

Alfred J. Yardley has been elected president of Jenkins Bros., manufacturers of valves, succeeding his father, Farnham Yardley, who becomes chairman of the board, after serving as president for the past 30 years.

Six changes have been made in the executive functioning of the Holyoke branch of the Worthington Pump & Machinery Corp. **A. M. Soutter** has been appointed purchasing engineer of the Holyoke works; **E. E. Foote** is assistant to the purchasing engineer; **O. J. Schorer** becomes engineering assistant to the works manager; **P. H. Nast** has been appointed chief engineer of the rock drill & air tool division; **F. G. Riedel** is chief engineer of the Freon compressor division, retaining his title of works director of all research; **Justin Neuhoff** is chief engineer of the air conditioning and condensing units division.

The shovel and crane division of Lima Locomotive Works, Inc., Lima, Ohio, announces the appointment of **M. E. Army** and **Ralph Rodgers** as assistant district managers of the Pacific Coast district. Mr. Army will continue to make his headquarters with Smith Booth Usher Co., 2001 Santa Fe Ave., Los Angeles, and Mr. Rodgers will have his office with Paul Fenwick, district manager for the Lima company, with offices at 1315 Howard St., San Francisco.

The advancement of two of Masonite Corp.'s sales executives has been announced. **Earl W. Hadland** has been made manager of dealer sales. **Elmer R. Graebner** succeeds Mr. Hadland.

Appointment of Edward Ehrbar, Inc., Brooklyn, N. Y., and Ehrbar Equipment Co., Irvington, N. J., as distributors for Gradall, new multipurpose earthmover being manufactured by the Warner & Swasey Co., is announced.

There are no "HANDLE WITH CARE" signs on equipment like this . . . when it's built with

U·S·S High Strength Steels

Use these more efficient steels . . .

★ To increase strength and ruggedness without increasing weight.

★ To reduce deadweight without reducing strength, stamina or service life.

★ To insure high resistance to shock, impact, wear, fatigue and atmospheric corrosion.

★ To obtain superior formability and weldability.

TEN years ago things were different. We remember, one day, talking to a sub-contractor on the Tygart Dam down in West Virginia and he told us this:—"I've got a bulldozer on this job that is powered so high we can crowd it into the work and spring the frame right out of shape." When we told him about new, high-strength steels we had just developed that would make contracting equipment stronger and tougher with no increase in weight, he was frankly skeptical.

But remember, that was ten years ago. Since then earth-moving equipment has changed a lot. Much of it is built of better steels—U·S·S High Strength Steels — and it's plenty stronger than before. Sturdier and tougher too. More resistant to shock, impact, abrasion and atmospheric corrosion. Crowd one of these modern bulldozers too hard and you may stall the engine, but nothing will give. It's just too rugged.

The same holds true for today's scrapers, trucks, and shovels built of U·S·S High Strength Steels. With these service-tested, continually improved steels, equipment builders have developed fast-stepping and high-production equipment that does more, lasts longer and costs less to run . . . that won't lie down on the job no matter how hard you push it.

We have had ten years' and more experience in applying these superior steels to many different kinds of digging, loading and hauling equipment. If you want practical engineering advice and the latest fabricating data to help you apply them for the improvement of *your* equipment, call on us.

U·S·S HIGH STRENGTH STEELS

U·S·S COR-TEN · U·S·S MAN-TEN · U·S·S ABRASION-RESISTING · U·S·S MANGANESE-NICKEL-COPPER

USS HIGH STRENGTH STEEL UNITED STATES STEEL

7-947

UNITED STATES STEEL AMERICAN STEEL & WIRE COMPANY, Cleveland, Chicago & New York
CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh & Chicago · COLUMBIA STEEL COMPANY, San Francisco
NATIONAL TUBE COMPANY, Pittsburgh · TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham
UNITED STATES STEEL SUPPLY COMPANY (Warehouse Distributors), Chicago · UNITED STATES STEEL EXPORT COMPANY, New York

Appointment of two new regional managers, **Walter N. Westland** for the Eastern and **George W. Stevens**

for the Mid-Continent regions, has been announced by the Cummins Engine Company, Inc., Columbus, Ind.

R. G. Le Tourneau, Inc., Peoria, Ill., has recently made several changes in its domestic sales division. **Robert C. Lewis** is installation manager for the company; **Keith Thompson,** applications engineer; **O. A. (Jack) Williams,** Western sales manager; **E. M. Ferguson,** Eastern sales manager; **C. D. Fey,** industrial sales representative for the entire country. The company's central sales office has been moved to Kansas City, Mo.

Harnischfeger Corp., Milwaukee, builder of P&H products, has announced the appointment of **Ralph D. Holcomb** as general sales manager. He will direct the sales of all P&H products, excavators, road machinery, hoists, cranes and welding equipment.

C. Clark Moore has been appointed as export sales engineer of LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa, with headquarters in New York City.

Appointment of M. V. Cornell of Marion, Ohio, as sales manager of the Marion Power Shovel Co. has been announced. He has been associated with the company since 1938, in charge of sales in eastern Ohio and western New York state.

Crouse Hinds Co., Syracuse, N. Y., has completed 50 years of successful service to the electric segment of building construction. An attractive booklet, in a limited edition, tells the story of the achievement.

Arthur McCutchan, formerly with the engineering division of the Detroit Edison Company, has been appointed senior research engineer of the product engineering and research department of Tube Turns, Inc., Louisville, Ky.

FOR TIE-RODS call Bethlehem

Manufactured in a complete range of sizes, Bethlehem Tie-Rods come plain or upset in single or multiple units, and with either cut or rolled right- or left-hand threads. Single-unit tie-rods are supplied in lengths up to 46 ft. Multiple-unit tie-rods can be furnished in any length.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Bethlehem also manufactures for the Construction Industry:

BOLTS AND NUTS • TURNBUCKLES • CLEVISES • RIVETS • SPIKES • WASHERS

At the annual meeting of National Clay Pipe Manufacturers, Inc., **G. L. Avery,** president of Lehigh Sewer Pipe & Tile Co. of Fort Dodge, Iowa, was elected president of the national association.

Townsco Equip. Co., Oklahoma City, Okla., has been appointed by Barber-Greene Co., Aurora, Ill., as exclusive distributor in Oklahoma, representing the Barber-Greene construction and industrial divisions.

Addition of the widely-publicized concrete housebuilding Tournalayer unit to its sales line and the formation of the Tournalayer sales division of R. G. LeTourneau, Inc., has been announced. **Richard L. LeTourneau** has been appointed manager of the newly created division.

The Duke Equipment Co., Montreal, announces the appointment of **F. W. Dickie** to its sales force, at the Halifax, N. S., office.

The Heil Co., Milwaukee, Wis., announces the appointment of **Gordon Stuart McKenty** as merchandising manager of the company's road machinery division. He brings a wealth of construction and engineering experience to his new position, which will include assisting in the development of new products and markets for the road machinery field.

Appointment of T. R. Johnson as general manager of the Keystone asphalt products division of the America-Marietta Co. has been announced.

HOOVER DAM

(Continued from page 68)

41,200 cu.yd. of concrete was placed in the four tunnels.

All of the concrete was mixed with a Ransome 34E dual-drum paver set on the crib cofferdam. Materials were dry-batched at a plant below the No. 1 portal and delivered to the paver in 1-yd. batches in dump trucks with three 1-yd. compartments. As durability was of prime importance, a maximum of 0.55 water cement ratio, by weight, was used throughout

(Continued on page 156)

Here are five important reasons why Transite Sewer Pipe helps reduce sewage disposal costs:

Faster Installation. Because Transite Sewer Pipe is light in weight and made in long 13-foot lengths, it is easier to handle...easier to lay this pipe to line and grade. And longer lengths mean fewer joints...faster installation.

Lower Excavation Costs. Because of its low friction coefficient (n = .010), Transite Sewer Pipe has an unusually high flow capacity. Thus, flatter grades, with correspondingly lower excavation costs, are often possible.

Use of Smaller Diameter Pipe. Instead of using flatter grades, designers sometimes take advantage of Transite's high flow capacity by selecting smaller diameter pipe.

Reduced Treatment Costs. Transite Sewer Pipe joints combine tightness with flexibility and so guard against infiltration. Tighter joints cut the load at the disposal plant...help reduce treatment costs.

Smaller Treatment Plants. Because Transite minimizes infiltration, plant capacity is more efficiently used. Where new plants are being designed, substantial savings in the initial cost of construction and equipment often may be effected.

Get full details by writing for the Transite Sewer Pipe brochure. Address Johns-Manville, Box 290, New York 16, New York.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville TRANSITE SEWER PIPE

(Continued from page 154)

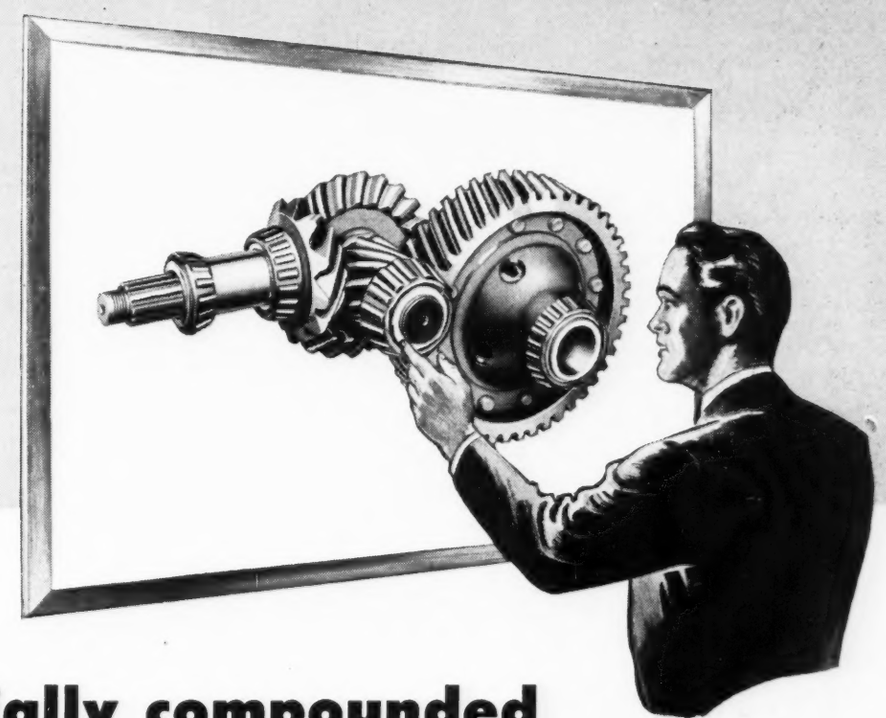
the job for tunnel concrete, with a maximum of 4-in. slump. In the massive sections 3-in. maximum size aggregate was used, but in heavily reinforced sections and for finished surfaces, the gravel was 1½ in. maximum size.

The interior formed surfaces of the tunnels up to spring line were given a special finish. This operation called for the surface to be sandblasted, followed by a cleaning with high velocity air and water jets. While the surface was still wet a 1:1½ sand cement mortar was brushed on and stoned in with a 60-grit grinding stone until the surface was smooth, fairly hard and almost dry. Curing with water was then started and carried on for 14 days. Air power grinders with 30-grit stones were then used and the surface was ground until the excess mortar was ground off which left a smooth, hard, and dense wearing surface which will resist cavitation.

Robert L. Jenks was project manager for the Guy F. Atkinson Co. The work was performed under the direction of the Bureau of Reclamation, United States Department of the Interior.

NEW

STANDARD HEAVY DUTY GEAR LUBRICANTS



. . . specially compounded for truck and bus differentials

Now you can get added protection for costly final drive and differential gearing on trucks and busses. Many truck operators and manufacturers have recognized the need for a lubricant especially designed for the high-torque loading encountered in truck and bus rear axle applications.

New Standard Heavy Duty Gear Lubricants fill this need. There are three grades available—No. 80, No. 90 and No. 140—providing a range of lubricants to meet seasonal operating requirements in various heavy duty services. The No. 80 and No. 90 grades meet the exacting requirements of U. S. Army Specification 2-105B. The No. 140 grade, although not a part of this specification, passes the same performance tests as the other two grades. Each of these lubricants is made of a balanced blend of stable base oils with high viscosity index and contains a special additive. This combination gives a non-corrosive lubricant possessing excellent extreme pressure characteristics.

These all-purpose lubricants are particularly adaptable for use in truck and bus final drives—both hypoid and spiral bevel gears—but also have other recommended applications—in transmissions, steering gears, fluid-lubricated universal joints, etc. A Standard Automotive Engineer will help you test this new line of maintenance-reducing gear lubricants.

Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

Advertisers in this issue

Acme Wire & Iron Works 45
Adams Manufacturing Co., J. D. 97
Advance Car Mover Co. 140
Aircraft Standard Parts Co., Inc. 156
Alemite Div., Stewart-Warner Co. 99
All-Purpose Spreader Co., The 10
Allis-Chalmers Mfg. Co. 48, 49
American Hoist & Derrick Co. 34
American Manganese Steel Div., American Brake Shoe Co. 61
American Steel & Wire Co. 119
Armco Drainage & Metal Pdts. Co, Inc. 144
Armstrong Bros. Tool Co. 112
Armstrong Rubber Co. 60
Atlas Powder Co. 50
Austin-Western Co. 40

Barber-Greene Co. 26
Bay City Shovels, Inc. 20
Bethlehem Steel Co. 46, 131, 153
Blaw-Knox Div., Blaw Knox Co. 100
Briggs & Stratton Corp. 117
Bucyrus-Erie Company 58

Caine Steel Co. 142
Carlyle Rubber Co. 140
Carnegie-Illinois Steel Corp. 151
Carver Pump Co. 136
Caterpillar Tractor Co. 33
Chain Belt Co. 109
Cleveland Trencher Co., The 132
Coffing Hoist Co. 154
Complete Machy & Equipment Co. 160
Construction Machinery Companies 134
Continental Motors Corp. 115
Cumberland Portland Cement Co. 6
Cummins Engine Co., Inc. 103

Diamond Chain Co., Inc. 55
Dixon Valve & Coupling Co. 150
Du-All Scaffold Bracket Co. 35
duPont de Nemours & Co., E. I (Fabrics Division) 138

Electric Tamper & Equipment Co. 104
Embury Mfg. Co. 106
Etnyre & Co., E. D. 152
Euclid Road Machinery Co., The 7

Foote Co., Inc., The 133
Ford Motor Company (Industrial & Marine Sales Dept.) 121
(Truck Division) 105

Gardner-Denver Co. 59
General Electric Company 39
General Excavator Co., The 135
General Motors Corp.
(Detroit Diesel Engine Div.) 42
(Truck & Coach Div.) 139
Goodall Rubber Co., Inc. 110
Goodrich Company, B. F. 9
Goodyear Tire & Rubber Co., The 62
Gorman-Rupp Co., The 149
Griffin Wellpoint Co. 100
Gulf Refining Co. 128

Haiss Mfg. Co., Inc., Geo. 36
Harnischfeger Corp. 129
Haynes Products Co. 160
Hazard Wire Rope Div., American Chain & Cable Co., Inc. ..... 3rd Cover
Heil Company, The 141
Heltzel Steel Form & Iron Co. 98
Hetherington & Berner, Inc. 24
Highway Equipment Co., Inc. 126
Hose Accessories Co. 156
Hough Co., The Frank G. 56
Huber Mfg. Co., The 37

Independent Pneumatic Tool Co. 18, 19
Inland Steel Co. ..... 2nd Cover
International Harvester Co.
(Motor Truck Division) 21
(Industrial Power Division) 57
Iowa Manufacturing Co. 44
Irvington Form & Tank Corp. 32

(Continued on page 160)

WHERE TO BUY

Featuring additional Products, Specialties and Services for the Construction Industry

POSITIONS VACANT

ASSISTANT OR Associate Professor wanted. Mechanical engineer, graduate with some general experience to head mechanical engineering division of new engineering school—teaching experience preferred but not essential. Salary depending on qualifications. Send for application form to Engineering Department, Arkansas State College, Jonesboro, Arkansas.

ASSISTANT OR Associate Professor wanted. Electrical engineer, graduate with some experience to head electrical engineering division of new engineering school—teaching experience preferred but not essential. Send for qualification forms to Engineering Department, Arkansas State College, Jonesboro, Arkansas.

WANTED: CONSTRUCTION Superintendents. Asphalt or other paving experience desirable. Ann Arbor Construction Co., 221 Felch Street, Ann Arbor, Michigan.

Advertisers Index

(Continued from page 158)

Jaeger Machine Co., The 13
Jahn Company, C. R. 146
Johns-Manville 134, 155
Jones & Laughlin Steel Corp. 93
Joy Mfg. Co. (Sullivan Div.) 41

Koehring Company 28, 29

LaPlant-Choate Mfg. Co., The 22, 23
Laughlin Co., The Thomas 144
LeRoi Company 53
Leschen & Sons Rope Co., A. 8
LeTourneau, Inc., R. G. 16, 17
Lima Locomotive Works, Inc. 143
Lincoln Electric Co., The 125
Link-Belt Speeder Corp. 159
Lone Star Cement Corp. 5
Lufkin Rule Company 112

Macwhyte Company 54
Mall Tool Company 158
McKiernan-Terry Corp. 150
Mercer-Robinson Co., Inc. 148
Michigan Power Shovel Co. 114
Mine Safety Appliances Co. 120
Minneapolis-Moline Power Implement Co. 130
Mixer Manufacturers Bureau 123
Moretrench Corporation 51

Northwest Engineering Co. 11
Novo Engine Co. 27

Oliver Corporation, The 2, 3
Onan & Sons, Inc., D. W. 146
Osgood Company, The 135
Owen Bucket Co., The 152

Page Engineering Co. 122
Paris Manufacturing Co. 124
Perfection Steel Body Co., The 102
Pettibone Mulliken Corp. 108
Preformed Wire Rope Information Bureau 147

R. P. B. Corporation 47
Red Star Products, Inc. 12
Rogers Brothers Corp. 158
Schramm, Inc. 25
Seaman Motors, Inc. 38
Searchlight Section 160
Shunk Mfg. Co. 120
Sinclair Refining Co. 137
Snap-on Tools Corp. 107
Socony-Vacuum Oil Co., The 30, 31
Sonoco Products Co. 118
Southwest Welding & Mfg. Co. 127
Standard Oil Co. (California) 111
Standard Oil Co. (Indiana) 157
Steel Sash & Sales Service 160
Sterling Machinery Corp. 160
Sterling Wheelbarrow Co. 154
Syntron Company 144

Texas Company 14, 15
Thermoid Company 101
Thew Shovel Co., The 43
Timken-Detroit Axle Co., The 145
Timken Roller Bearing Co., The ..... 4th Cover

Unit Crane & Shovel Corp. 52
United States Steel Corp., Subsidiaries 95, 119, 151
Universal Atlas Cement Co. 95

Vickers, Inc. 116
Vulcan Iron Works 96

Wellman Engineering Co., The 148
Where to Buy Section 160
White Mfg. Co. 156
Whiteman Mfg. Co. 142
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp. 106
Worthington Pump & Machy. Corp. 112, 113

Uniform Performance

an outstanding Quality of TIMKEN BITS

The ability of Timken Rock Bits to drill faster and further in any kind of rock has made them preferred wherever rock is drilled — in mining, construction and quarrying.

Equally important to their users however — even rated first by some — is uniformity of performance. This means that every Timken Bit will give the same outstanding service in speed of penetration and distance drilled when used in the same kind of rock.

This uniformity is due to the development of the special Timken Steel used in the production of Timken Bits and to Timken metallurgical "know how" in heat treatment and hardening.

Wherever you are, there's a Timken Rock Bit distributor within telephone call. Conversion and reconditioning shops also are conveniently located for quick service. Put Timken Bits to work now and cut your drilling costs while increasing production. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

ROCK BITS